UNITED STATES ARMY

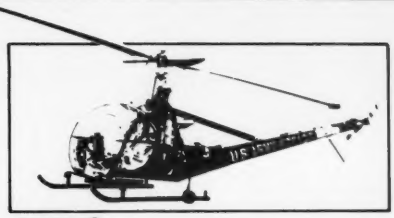
AVIATION DIGEST

DECEMBER 1985

AH-64 APACHE

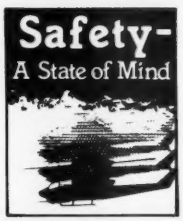
DECEMBER 1985 • VOLUME 31 • NUMBER 12

1 **TWOS' Impact on the AWO Corps,** MG Ellis D. Parker
2 **AH-64 Apache,** MG Charles F. Drenz
9 **Army Aviation Museum: H-23**
10 **Views From Readers**
13 **DES Report to the Field: Precision vs. Nonprecision Approach,** CW3 Robert M. Baucom
14 **PEARL'S**
16 **Cockpit Management—The Safety Window,** Mr. Douglas Schwartz
20 **Aviation Personnel Notes: Warrant Officer Division,** CW4 John R. Dougherty; **Volunteers Sought For Aeroscout Observer Training**
22 **Voices to the Sky,** CPT Wayne Husemann
28 **Safety—A State of Mind,** CW3 Dennis E. Dura
30 **First Chinook Aerial Refueling,** MAJ (P) Charles (Chuck) F. Nowlin
35 **ATC Action Line: Airfield Crash Grid Map**
36 **J-Series Command,** CPT Thomas M. Kolb
38 **Mass Casualty "MASH" Exercise,** MSG Ed Winn
40 **Soviet Air Assault Brigade, Part II: Employment,** COL Jack E. Easton and MAJ (P) Charles B. Cook



page 9

page 22



page 28

page 40

Cover: The Program Manager for the AH-64 Apache advanced attack helicopter describes the onboard fire control computer and armament options available for this antitank, antipersonnel, antiair weapon system. Story begins on page 2. Cover art by Paul Fretts.

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Use of funds for printing of this publication has been approved by the Secretary of the Army, 19 February 1985, in accordance with Army Regulation 310-1. Second-class postage paid at Daleville, AL, and additional mailing offices.

Active Army units receive distribution under the pinpoint distribution system as outlined, in AR 310-2. Complete DA Form 12-5-R and send directly to CDR, AG Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220. For any change in distribution requirements, initiate revised DA Form 12-5-R.

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Those not eligible for official distribution or who desire personal copies of the *Digest* can order the magazine from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

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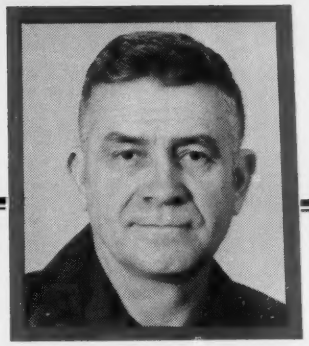
Major General Ellis D. Parker
Chief, Army Aviation Branch



TWOS' Impact on the AWO Corps

MUCH HAS BEEN written to publicize the Total Warrant Officer Study (TWOS) and its impact on the Army Warrant Officer Corps. We in Army Aviation have endeavored to provide continuous updates on the progress of the issues and their impact upon the members of our branch.

I would like to narrow our perspective slightly and focus on one of the more significant TWOS issues—proponent and Department of the Army responsibilities for management of warrant officers (see "Aviation Personnel Notes: Warrant Officer Division," page 20).

As the proponent for Aviation, I have the responsibility to ensure that all facets of branch-specific personnel management are accomplished. These responsibilities encompass recruitment, training, assignments and professional development policies for Aviation warrant officers (AWOs).

The Aviation Branch always has been involved in the recruitment of our AWOs. However, all branches are now playing a more active role in the recruiting process. This will permit us to develop a larger, better qualified pool of applicants from which to select.

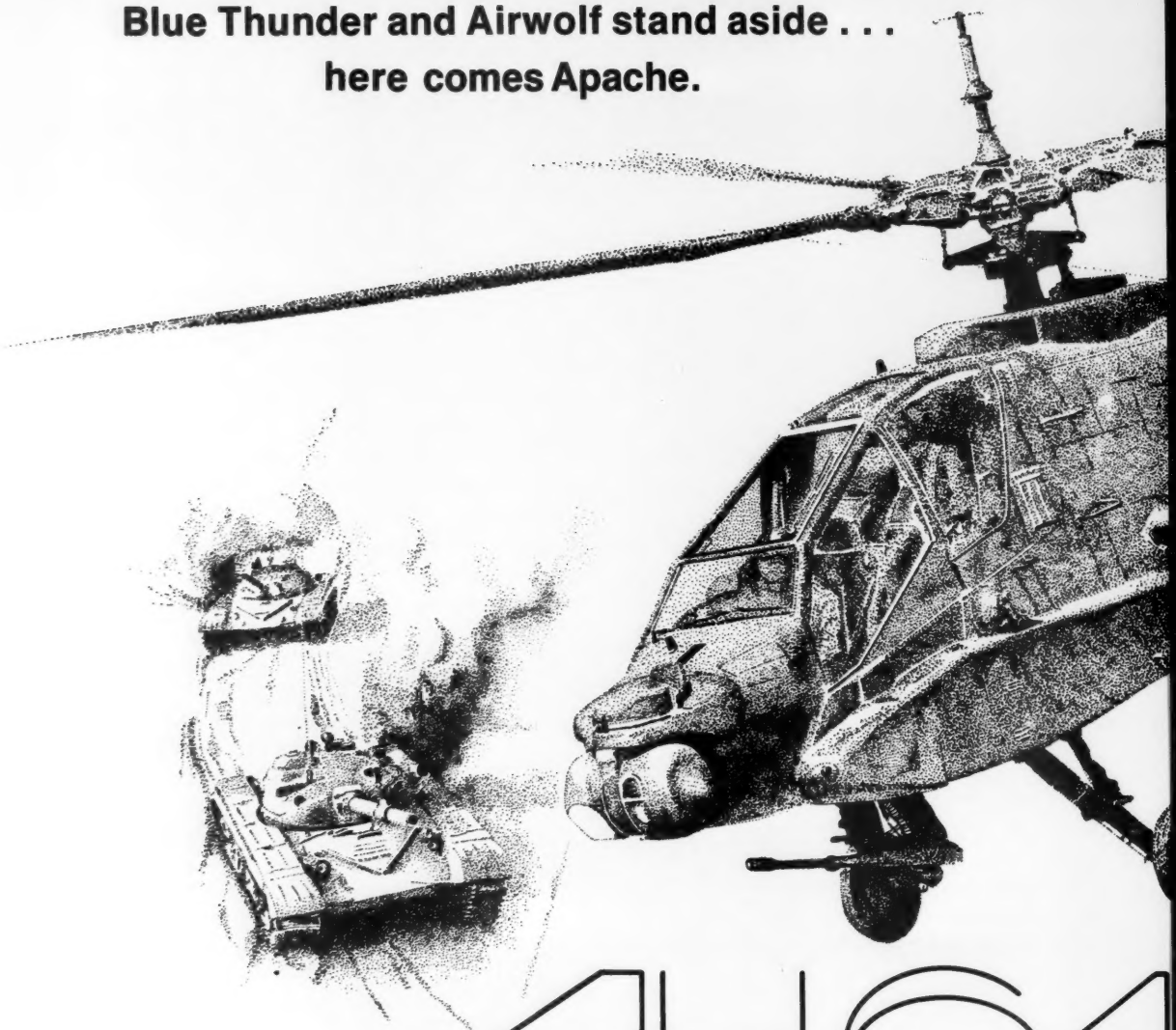
Each branch also will be tasked to design professional development (PD) plans for each warrant officer military occupational specialty (MOS). These plans will be tailored by MOS to ensure that warrant officers are managed and trained to Army and branch requirements. The PD plans begin with preappointment qualification training and go on to delineate the 30-year career pattern by MOS. Proponents are also responsible for the development of branch-specific training found in the senior-level warrant officer training courses. An integral part of these training plans includes the recurring validation of warrant officer certifications. Currently, the AWO is already required to complete such a validation in the form of the Aviation Annual Written Examination and the Annual Aviator Proficiency and Readiness Tests. Validation criteria for other warrant officer MOSs are being developed.

As the TWOS' proposals are implemented proponents will become responsible for writing their MOS related portions of Army Regulation 611-112, "Manual of Warrant Officer Military Occupational Specialties," and Department of the Army Pamphlet 600-11, "Warrant Officer Professional Development and Accession Criteria." These publications contain the guidelines for warrant officer accessions, training and management to include military and civilian education requirements/goals by MOS.

Historically, Warrant Officer Division, U. S. Army Military Personnel Center (MILPERCEN) has been saddled with the responsibility of both designing and implementing warrant officer management policies. In the future proponent branches will be given the responsibility to design warrant officer personnel management policy and to forward their recommendations through Training and Doctrine Command to the Deputy Chief of Staff for Personnel at the Department of the Army for approval. Once a policy is approved, it will be up to MILPERCEN to implement that policy.

The Aviation Branch/Aviation Center point of contact for Aviation warrant officer personnel management is the Aviation Proponency Office. Any comments/recommendations you have in reference to AWO management should be sent to: Commander, U. S. Army Aviation Center, ATTN: ATZQ-P, Ft. Rucker, AL 36362-5000.

Blue Thunder and Airwolf stand aside . . .
here comes Apache.



AH-64 APACHE

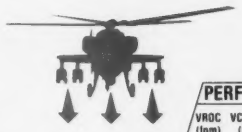
Major General Charles F. Drenz
Program Manager-Advanced Attack Helicopter
U. S. Army Materiel Development and Readiness Command
St. Louis, MO

illustration by Paul Fretts

The Armed Helicopter Story– AH-64 Armament

THE AH-64 APACHE advanced attack helicopter (AAH) was the first helicopter developed specifically for day, night and adverse weather antiarmor missions. It is a twin engine, four bladed helicopter operated by a tandem-seated crew of two. Apache delivers firepower quickly and with extreme accuracy.

Its developer, prime manufacturer and armament integrator is McDonnell Douglas Helicopter Company (formerly Hughes Helicopters). The armament suite for the Apache consists of the HELLFIRE missile, 2.75 inch aerial rockets and the 30 mm Area Weapon System (AWS). Armament payload options for specified missions are shown in figure 1. To deliver munitions on target, the armament subsystems are integrated through an advanced target acquisition and fire control system (figure 2). Precision delivery is achieved by use of the Target Acquisition Designation System (TADS). Backup capability is provided by the Integrated Helmet and Display Sight System (IHADSS). The armament, fire control and navigation subsystems are interconnected via a closed loop multiplex system. The heart of this integrated system is the fire control computer (FCC). The FCC receives targeting information, aircraft position, air data, and stores management data. It integrates these with ballistic equations to provide aiming instruction and weapons control.



MISSION	WING	GUN	WING	PERFORMANCE VROC (fpm) IRP	VCRUISE (KTS) MCP	MISSION ENDURANCE (HRS)	MISSION GROSS WT. (LBS.)
ANTI-ARMOR (DEFENSE) MID-EAST 4000'/95°F	4 HF	320 RDS	4 HF	1450 fpm	145 KTS	1.83 HRS	(14395)
ANTI-ARMOR (DEFENSE) MID-EAST 4000'/95°F	4 HF	1200 RDS	4 HF	875 fpm	145 KTS	1.87 HRS	(15250)
ANTI-ARMOR (DEFENSE) EUROPE 2000'/70°F	8 HF	1000 RDS	8 HF	1075 fpm	147	2.5 HRS	(16977)
COVERING FORCE (AIRCAV) MID-EAST 4000'/95°F	8 HF	440 RDS	8 HF	650 fpm	145	1.83 HRS	(15550)
COVERING FORCE (AIRCAV) EUROPE 2000'/70°F	4 HF 19 RKTS	320 RDS	4 HF 19 RKTS	1240 fpm	145	2.5 HRS	(16591)
AIRMOBILE ESCORT MID-EAST 4000'/95°F	19 RKTS	1200 RDS	19 RKTS	850 fpm	146	1.83 HRS	(15320)
AIRMOBILE ESCORT EUROPE 2000'/70°F	38 RKTS	1200 RDS	38 RKTS	800 fpm	145	2.44 HRS	(17350)

FIGURE 1: Armament for specific missions.

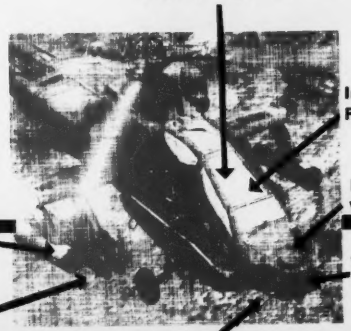


FIGURE 2: Armament integration.

HELLFIRE

Apache's primary armament is its point target weapon system known as the HELLFIRE Missile System (figure 3). Although HELLFIRE was developed specifically for Apache, the beginning stage of its development in the early 1970s necessitated that the original specification for the AAH require the primary armament to be the TOW missile. The AAH was to carry eight TOW missiles; four on each stub wing. The TOW is regarded as an outstanding antitank weapon. However, it has the disadvantage that its command-to-line-of-sight guidance requires the launch aircraft to remain within view of the target. This characteristic would greatly increase the exposure of the AAH to enemy fire. As the HELLFIRE development progressed successfully, the AAH specification was changed to add HELLFIRE, in favor of TOW.

The HELLFIRE concept originated in the 1960s at the U. S. Army Missile Command (MICOM) Research and Development Laboratory. Competing advanced development contractors in the early 1970s were Rockwell International and Hughes Aircraft Company. Rockwell was selected in 1976 for the full-scale development phase. Following successful HELLFIRE qualification and early production by Rockwell, MICOM established production competition with Martin Marietta Corporation, who was the seeker developer/manufacturer. The two companies now are both producing the complete missile.

The Apache has the capability to carry a maximum of 16 HELLFIREs for antiarmor missions. Each missile has a laser seeker that homes in on the laser spot energy reflected by a designated target (figure 4). Its shaped-charge warhead attacks a tank in its upper area where it is most vulnerable. Combined with the laser designator of the TADS, or other remote designators, HELLFIRE provides an antiarmor punch at greater standoff ranges than is achievable by TOW.

FIGURE 3: HELLFIRE missiles were developed for the Apache.

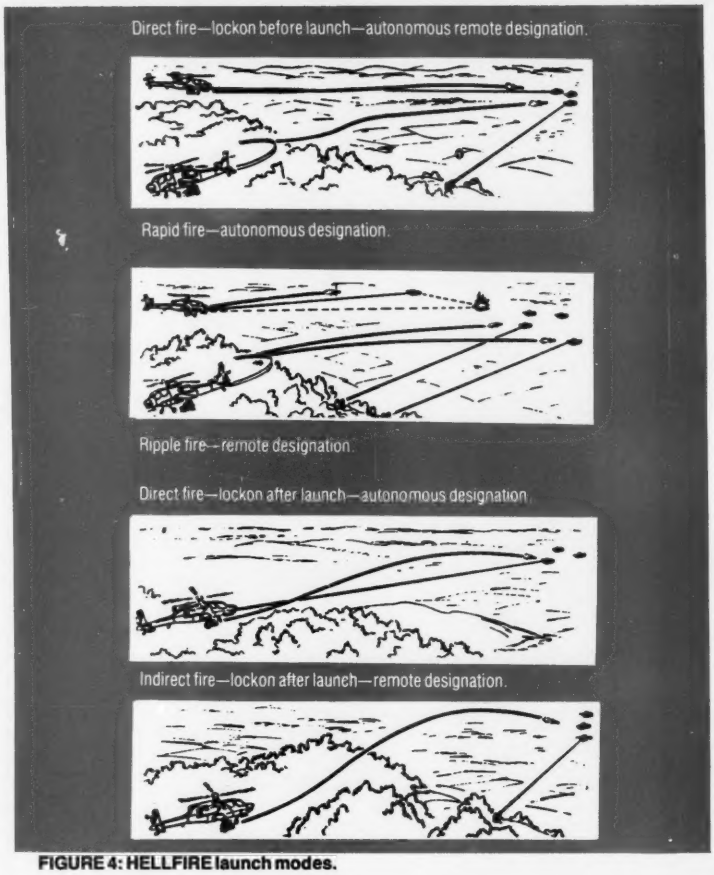

Direct fire—lockon before launch—autonomous remote designation.
Rapid fire—autonomous designation.
Ripple fire—remote designation.
Direct fire—lockon after launch—autonomous designation.
Indirect fire—lockon after launch—remote designation.

FIGURE 4: HELLFIRE launch modes.

(Actual range capabilities are classified.) Also, Apache has the ability to deliver HELLFIREs in the indirect mode from defilade positions; thus, the Apache can kill without being seen. This mode requires that the target be lased by an airborne or ground based designator remotely located from the firing aircraft.

Multiple launches of HELLFIREs are achieved via the ripple and rapid firing modes. This provides greater flexibility in target engagement and improved effectiveness.

30 mm Area Weapon System

The secondary armament for the AAH was specified in the Materiel Need Document as a turret-mounted 30 mm cannon to meet the helicopter's particular requirements. The 30 mm Area Weapon System as it exists today consists of the M230 Chain Gun (figure 5), lightweight turret and a Linier Linkless Feed System. In 1972, Hughes undertook to design a gun within its own organization. The result of this effort was a 30 mm lightweight single barrel gun with a unique rotating bolt mechanism driven by a chain. At this time, Bell Helicopter was in competition with Hughes for the AAH program. Bell had contracted with General Electric for a 30 mm Gatling type weapon designated the XM188. A "shoot off" (data acquisition test) was conducted by Rodman Labs at Rock Island Arsenal in 1975 to assist the AAH source selection board in making its weapon selection.

On 10 December 1976, Hughes Helicopters was awarded a contract for both the AAH and the 30 mm M230 Chain Gun as the area suppression weapon for the AH-64. Early in 1976, the Department of Defense directed that the XM230 be rechambered to fire ADEN/DEFA (British/French 30 mm gun systems for fighter aircraft) type ammunition for purposes of North Atlantic Treaty Organization interoperability. To ensure that interoperability, Hughes was given the responsibility for development of a family of U.S. 30 mm rounds: XM788 (TP) and XM789 (HEDP). The modified XM230 was designated the SM230E1 and first fired in March 1978. The M230 Chain Gun is now standard for the U.S. Army and is in production for installation on the Apache.

The 30 mm ammunition handling system was originally proposed to be a rotating ammunition drum with a system capacity of 1,200 rounds. Development problems precluded this system from advancing beyond an engineering model. In June 1980, Western Design Corporation was added to the AH-64 team by Hughes Helicopters. They were tasked with developing an ammunition feed and storage system for the AH-64. Western Design chose the Linier Linkless Magazine System (LLMS) concept that had been developed for the Air Force and adapted it for the AH-64. The LLMS consists of a 1,110 round ammunition storage magazine and a hydraulically powered carrier system that stores and—upon demand—transports ammunition to the M230 gun.

FIGURE 5: M230 Chain Gun is a 30 mm Area Weapon System.

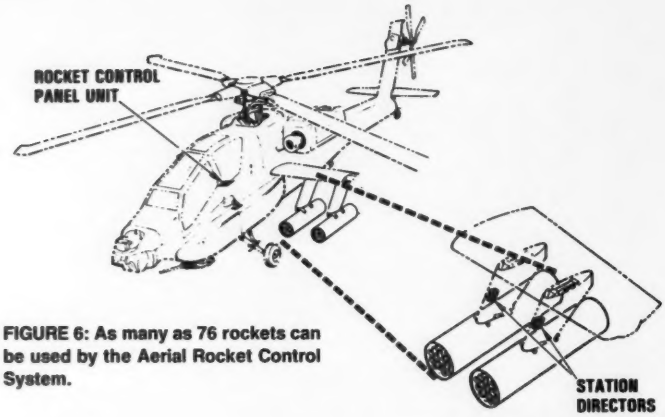


FIGURE 6: As many as 76 rockets can be used by the Aerial Rocket Control System.

Rockets

Completing the Apache's armament suite is the Aerial Rocket System. This system incorporates 2.75 inch folding fin aerial rockets that were originally developed by the U.S. Navy. Prior to the Korean War, they were used on fixed wing aircraft for air-to-air combat. During the Korean War they were adapted as an air-to-ground weapon. the 2.75 inch rockets soon became one of the first weapons to be integrated into U.S. Army helicopters. Early in the Vietnam War, some UH-1B/C Hueys were armed with rockets. They provided a potent weapon against the Vietcong. This capability was then enhanced by the AH-1 Cobra as a dedicated attack helicopter. The 2.75 inch rockets have been continued through the AH-1 series evolution including the current AH-1S Modernized Cobra. Rockets have been a requirement for the Apache since materiel need inception. Their assigned role is to supplement the 30 mm AWS as an air-to-ground weapon system against area targets.

The Apache can attack targets from 300 to 6,000 meters with up to 76 rockets. It does this through its Aerial Rocket Control System (ARCS) (figure 6). The ARCS consists of 1 rocket control panel, 4 station directors and up to 4 rocket launchers (19 rockets each). On the control panel, the pilot selects rocket type, quantity, burst height or penetration level, and manual or automatic range settings. The station directors, one in each pylon, provide charging signals to the rocket fuzes and firing voltages to the motors. The launchers house the various rocket motor, fuze and warhead combinations such as high explosive, flare, smoke, etc.

The Apache's advancement in helicopter application of rockets lies in its "articulating pylons." During flight they automatically position the launchers in elevation for most ranges. This action is directed by the fire control computer. Below 90 knots and up to 4,000 meter engagement ranges, the pilot needs to steer the aircraft in azimuth only. He does not have to perform the traditional nose-up maneuver. For target engagements beyond 4,000 meters, the FCC computes and provides cuing to elevate the nose for proper launch angles. This feature reduces the pilot's aiming error and increases tactical capability.

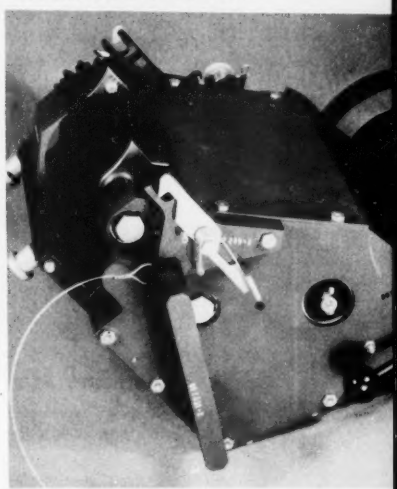
Rockets may be launched by the pilot or copilot gunner (CPG) individually or cooperatively. In the cooperative or precision mode, the CPG tracks the target with TADS, and the pilot steers the aircraft and fires the rockets. Rockets can be fired in singles, pairs and salvos of four.

Armament Support Equipment

Support equipment for Apache's armament are the 30 mm Loader/Downloader and the Captive Boresight Harmonization Kit (CBHK).

The Loader/Downloader (figure 7) can accommodate linked or unlinked rounds and provides the capability for three people to upload or download up to 1,200 rounds of 30 mm ammunition within 30 minutes in the field. The Loader/Downloader was developed and is manufactured by Western Design Corporation.

In order to achieve performance accuracy, the components of the armament and fire control systems must be aligned within a small fraction of a degree. To assure this alignment in the field, Apache units will have the CBHK. When alignment is required, the CBHK mainframe is attached to the forward bulkhead (figure 8). Maintenance personnel then attach optical instruments to the frame and aircraft components in order to establish lines-of-sight. Misalignments are measured and entered in the fire control computer as boresight correctors. Built by Photr[illegible]orporation, the CBHK is a major advancement over previous aircraft boresight kits. An aircraft system boresight can be accomplished within a small emplacement in less than 60 minutes.



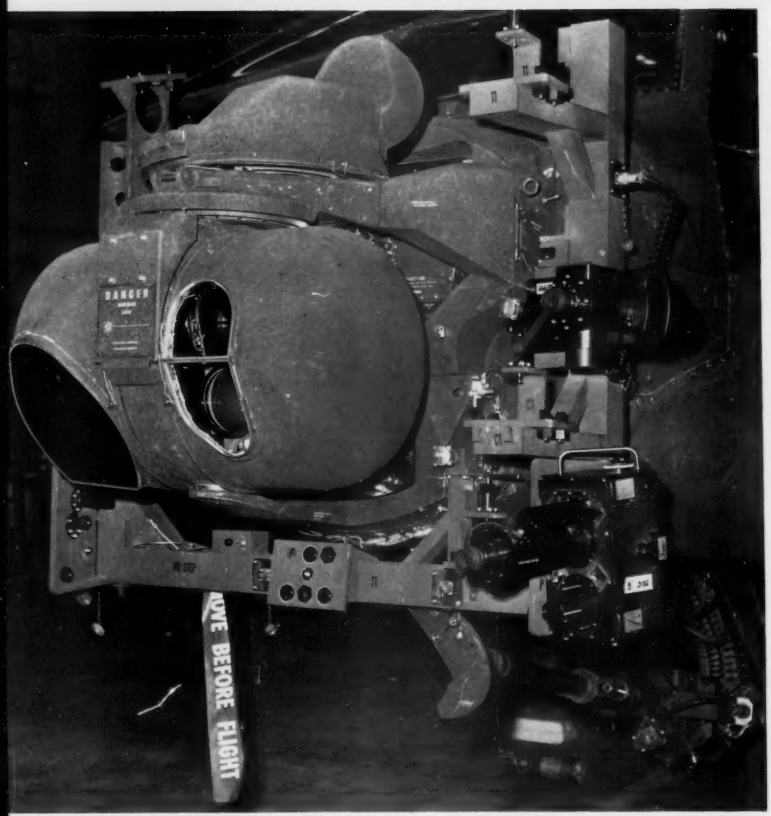
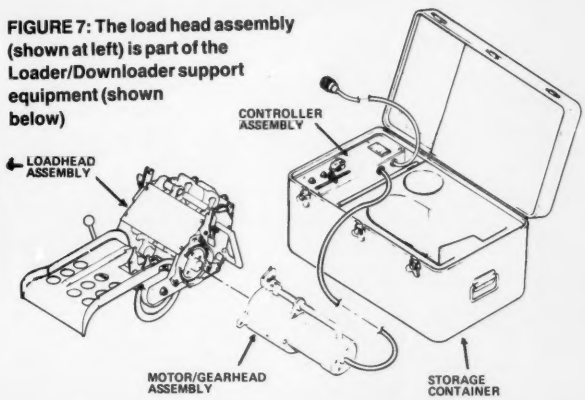


FIGURE 8: The Captive Boresight Harmonization Kit (above) is used to align the fire control system within a fraction of a degree for accuracy.

photo by R. Petitt

FIGURE 7: The load head assembly (shown at left) is part of the Loader/Downloader support equipment (shown below)



Future

What does the future hold for Apache armament? There are improvements ongoing and planned for the intermediate and long term.

Ongoing is the integration of the improved 2.75 inch rocket family named "HYDRA 70." "HYDRA" was the multiple headed serpent in Greek mythology, and "70" is for 70 millimeters, which is the metric equivalent of 2.75 inches. The HYDRA 70 was developed by the Rocket Management Office at the U.S. Army Missile Command. It offers improved accuracy and effectiveness through a new generation of warheads, fuzes, rocket motors and launchers. Since the HYDRA 70 was developed simultaneously with the Apache, the Apache already has integrated the hardware necessary to fuze and fire all HYDRA 70 rockets. It has the required cockpit remote settable fuzing and the necessary lightweight launchers. The remaining effort is a software modification to the fire control computer. This will incorporate the advanced ballistic algorithms required for accurate delivery of the new rockets. This methodology was recently developed by the U. S. Army Ballistics Research Laboratory.

The firepower improvement provided by HYDRA 70 is best represented by the new multipurpose submunition (MPSM) with the extended range MK66 rocket motor. The MPSM rocket, with cockpit remote range settable fuze, will provide the capability to engage materiel, personnel and light armor targets out to a range of 6,000 meters with greater accuracy and lethality. Just one of the nine M73 grenades in the MPSM warhead yields a lethality against prone personnel targets comparable to the whole warhead of the Vietnam era high explosive rocket warhead. Furthermore, the grenade's shaped charge will defeat light armor.

Intermediate/long term armament improvements are addressed in the AH-64 Preplanned Product Improve-

ment (P^3I) Program. The P^3I objective is to upgrade the AH-64 to meet the projected threat of the 1990s and beyond and be able to fight, survive and win in the Army 21 scenario. Areas of potential technical growth include weaponization, target acquisition, survivability, avionics, aeromechanics and propulsion.

The primary weaponization improvement planned is the addition of air-to-air Stinger (ATAS). The threat posed by Soviet attack helicopters has triggered the need for capability new to Army Aviation; air-to-air combat. The ATAS program will adapt, for aircraft firing, the existing, fielded Stinger missile. The basic Stinger is an infrared seeking, fire-and-forget, shoulder-fired, infantry air defense weapon. Recently, it was also deployed to U. S. ships off the coast of Lebanon for protection against terrorist aircraft kamikaze raids. Now under Army development by U. S. Army Aviation Systems Command and MICOM, the ATAS will be first fielded in the OH-58C/D Kiowa scout helicopters. The longer range Stinger missile will supplement the close-in air-to-air capability inherent in the Apache's 30 mm AWS. These weapons coupled with aircraft maneuverability will give the Apache a formidable capability to defeat enemy helicopters and fixed wing aircraft.

Delivery of Apache ordnance will be enhanced by improvement in target acquisition and fire control. Advanced aiming techniques, including air-to-air fire control, are planned for the 30 mm gun. This will provide increased accuracy, lower ammunition usage and higher probability of kill.

The TADS will be improved by increasing output data rate and accuracy of the data. Other potential improvements will be the Airborne Target Handover System (ATHS) and Automatic Target Recognizer (ATR). ATHS will provide a battlefield-mission computer that enables command and firing element crews to exchange target, stores management and other information using short data bursts rather than voice communication. The ATR will process TADS television and forward looking infrared radar sensor data to automatically detect, classify and prioritize hostile targets. Apache P^3I will reduce pilot workload, speedup target detection to target destroy times, reduce vulnerability and and increase its operational capability.

The Apache has demonstrated its ability as a flexible and responsive weapons platform that can effectively deliver large quantities and wide variety munitions on target. This ability provides the front line commander with the antitank/antipersonnel/anti-air weapon system that is required to ensure superiority through the year 2000.

Apache . . . firepower on the battlefield.

GOAL—
$2,500,000
December 1985—
$1,900,000
Cash and pledges

Army Aviation MUSEUM

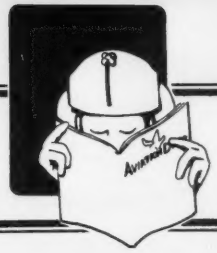
This is a series about the Army Aviation Museum Foundation fund drive. Currently, plans call for building a modern complex to house your Army Aviation Museum. Since last month additional donations have been received. However, we still have a ways to go, as the barometer above shows. If you would like to help "build" the Army Aviation Museum's new home, you are invited to send a tax deductible contribution to: The Army Aviation Museum Foundation, Box 610, Ft. Rucker, AL 36362-5000. If you desire additional information call Mr. Ed Brown at (205) 598-2508.

A Look At What's In Your Museum

In 1950, the Army purchased a Hiller YH-23 Raven for evaluation. This led to the initial order for 100 H-23s in fiscal year 1951. The H-23A models were the only ones made with a wheel-type landing gear. The majority of these aircraft were delivered in the air ambulance configuration. More than 2,000 models were added to the Army's inventory before production ceased. In 1955, H-23As began to be phased out of the Army. The helicopter on display was transferred to the U. S. Army Aviation Museum from the Army Aviation School.

Hiller H-23A Raven

VIEWS FROM READERS



Editor:

I am seeking information, photos, stories, personal accounts, etc., about the use of Soviet helicopters by the North Vietnamese forces during the war in Vietnam from 1960 to 1975. My purpose is to write a well-documented article on this topic. If anyone has materials, information, photos, and are willing to share them, please contact me as soon as possible. Thank you.

J. David Truby
P.O. Box 163
Shelocta, PA 15774

Editor:

The 145th Air Traffic Control (ATC) Platoon, Oklahoma Army National Guard, was ordered to annual training (AT) at Camp Gruber, OK, from 15 to 29 June 1985. The platoon conducted a highly successful training period during which several "first evers" for National Guard ATC platoons were achieved.

- The platoon deployed to, set up and operated a tactical airfield using all organic assigned equipment—ground controlled approach radar, ATC control tower and flight operations center.
- All assigned equipment, to include the AN/TPN-18 radar, was set up and operated without maintenance downtime, and without help from Active Component maintenance contact team personnel.
- Fifty-nine precision approaches were conducted into the field location during the 2-week period.
- Tactical ATC operations were conducted working live traffic, while the unit was in MOPP-4 gear (protective outer garments, boots, gloves and protective masks).
- All of the above was achieved without benefit of Active Component instructors. The only Active Component people involved in the platoon's AT period were the evaluation personnel.
- The 145 ATC Platoon has achieved 100 percent military occupational specialty qualification of its controller people, not including those in or scheduled for initial entry training and advanced individual training at Ft. Rucker. The platoon has also achieved 100 percent of authorized strength.

The 145 ATC Platoon feels it is the first National Guard tactical ATC unit, possibly the first Reserve Component ATC unit, to achieve all these tasks. They would be interested in hearing from any other unit which has accomplished all or any of these items. Contact SSG Dave Keating, 145 ATC Platoon, Lexington, OK 73051-9549.

MAJ James F. Crawford
OKARNG

Editor:

I welcome Mr. Keller's letter [last month's issue] and commend him for his interest and concern by taking the time to write to the *Aviation Digest* about the "Tank Busters" article. Before responding to Mr. Keller's letter, I must confess to being somewhat parochial toward Army Aviation. I suspect Mr. Keller already surmised as much.

I first want to address Mr. Keller's comment that, "The question was inappropriate to the article." My question, "Are tanks really the best means of fighting tanks," was naturally only a rhetorical question. Rhetorical questions merely serve to introduce or open a discussion or topic, and because no answer is expected to a rhetorical question none was offered. In this case, the topic intended was a short historical perspective on aerial "tank busters."

I'm not sure how LTG Reznichenko's quotation illuminates Belov's pronouncement. We do know, however, that "movement" and "firepower" of attack helicopters is at least the equal of tanks. As for holding terrain, aviation assets cannot do that—no question about it. Holding terrain takes infantry support even for tanks. As a contingency, FC-1-111, "Combat Aviation Brigade (CAB)," states the CAB can be given a sector of the defense. Normally this will not be done because to do so would take away its mobility and reduce the CAB's overall effectiveness and value to the division. That would be like making pillboxes out of tanks.

That the Soviets consider the attack helicopter a tank is a good point and, in fact, a point I made in my June 1984 *Aviation Digest* article, "Soviet Combat Helicopters Today" (I had read Suvorov also). As for the supposed logistics tail handicap of helicopters, forward arming and refueling point (FARP) procedures and other support means may actually favor the helicopter. These FARPs and the one-third rule, as well as aircraft survivability equipment, enhance the helicopter's ability to stay and fight.

Finally, I submit that the Mideast battles between Israel and Syria, and Iran and Iraq, and the lessons from Afghanistan and the Falklands have contributed insight and proven useful in evaluating the helicopter's worth on the battlefield. Which military forces in the world are *not* adding attack helicopters to their arsenals? But the most telling factor is that, *everywhere*, doctrine and tactics are being modified based on the capabilities of attack helicop-

ters—not because of any innovation in the tank, or because of any ability of the tank to influence warfare in a manner that we have not known about since 1945.

Mr. Edward J. Bavaro
Intelligence Research Analyst
Army Aviation Center
Ft. Rucker, AL

Editor:

Please publish the following announcement:

Xavier University ROTC 50th Year Anniversary and Military Ball will be held concurrently on 19 April 1986, at the Westin Hotel in Cincinnati, OH. All Xavier University Active Duty, Reserve Component and Retired officers are invited to attend. Point of contact is Major Howard L. Willis Jr., phone 513/745-3646, 3904 Winding Way, Cincinnati, OH 45229-1999.

MAJ Howard L. Willis Jr.
Assistant Adjutant

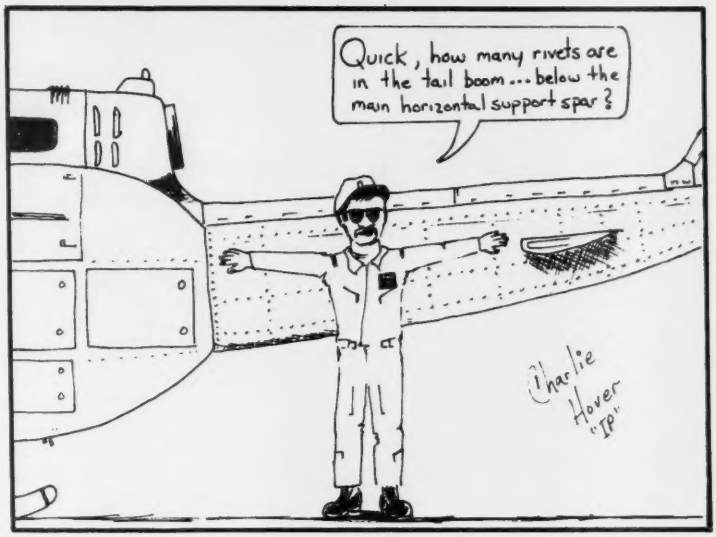
Editor:

The surviving members of the first three classes of Army Warrant Officer Helicopter Pilot Classes 51A, 51B and 52A are planning a reunion scheduled for the spring of 1987 at the Army Aviation Center, Ft. Rucker, AL.

Prior to the time of the reunion our group is making an effort to purchase an H-19C model Sikorsky helicopter. A down payment of $4,000 was made in June 1985. If it is ultimately purchased, the H-19C will be presented to the U.S. Army Aviation Museum at Ft. Rucker during the reunion.

We believe this helicopter deserves a place of honor in the Army Aviation Museum. It was the first cargo/passenger type helicopter in the Army inventory, and it saw extensive service in Korea during the latter part of the Korean War.

In the early 1950s, the Department of the Army cited the primary mission of the H-19C: "To provide short haul transport service to expedite tactical operations and logistical support in the forward areas of combat zones." Meanwhile, the Army Medical Services and Eighth Army quickly recognized that this helicopter's large carrying capacity offered a great potential for medical evacuation, which indeed soon became a routine function for the H-19Cs. From 15 to 17 July 1953, when a large-scale enemy attack was launched against the II Corps' and I Corps' front, the helicopter companies in Korea (flying H-13 Sioux and H-19 Chickasaw helicopters) evacuated 723 patients; of this number, 301 were evacuated on 1 day, 15 July 1953.



The H-19s also excelled in the mass movement of troops and supplies; and, during the battle for Hill 1065 in June and July 1953, the helicopters were brought into their true role of emergency resupply. An average of six H-19s were employed daily by the 6th and 13th Transportation Helicopter Companies for 21 days. They flew 550 hours and airlifted 880,374 pounds of supplies. Also, elements of the 5th Regimental Combat Team were placed in new defensive positions on one of the commanding peaks of the Christmas Hill sector. After transporting supplies and troops to appropriate sectors, the H-19s evacuated patients to rear area hospitals, carrying 323 casualties from 10 to 20 June 1953.

The H-19s were used in Operation Little Switch, Operation Big Switch and Operation By-Way. They transported 6,357 repatriated prisoners of war. They were involved in every conceivable mission from the tranportation of VIPs to the carrying of the armistice documents from Panmunjom to Kimpo Airstrip.

In this early period, the H-19C served both as the cargo and troop hauling "work horse" and also as a training vehicle for Army Aviation. It provided a multitude of techniques and concepts contributing to the growth of helicopter operations throughout the last 32 years. It also forgave a multitude of errors committed during the learning period.

We hope you will help us put the H-19C in the place it deserves in the Army Aviation Museum. Only 72 H-19C models were built and just a few remain. It is with this realization that we ask for your help in obtaining the funds needed to purchase one of these old helicopters.

Contributions may be made to: The H-19C Helicopter Museum Fund, in care of Jim Mowry, 3233 Gano, Houston, TX

VIEWS FROM READERS

77009. Or information can be obtained from CW2 George Holton, 113 Kate Street, Enterprise, AL 36330; telephone 205-347-4549. If we are unable to obtain the necessary funding to buy the H-19C helicopter, all funds collected by the time of the reunion will be donated to the Army Aviation Museum.

CW2 George Holton (Retired)
Enterprise, AL

Editor:

I make reference to my article in the July 1985 issue entitled "Night Vision and Electro-Optics Laboratory and the Flight Test Detachment—Joining Forces in the Conquest of Darkness." The caption on page 36 evidently has been causing some confusion as to the actual agency responsible for the development of the HGU-56/P Aircrew Integrated Helmet System. Night Vision and Electro-Optics Laboratory and Flight Test Detachment, as stated on page 42, is solely concerned with Aviator Night Vision Imaging System compatibility. The responsible developing office is the Project Manager-Aviation Life Support Equipment (PM-ALSE), a U.S. Army Aviation Systems Command organization.

CPT (P) Greg Kaufmann
U.S. Army

Editor.

I am attempting to compile a history of the Utility Tactical Transport Helicopter Company (UTT) from its establishment in July 1961 until its assets were absorbed by the 68th Aviation Company in August 1964. This unit pioneered the armed helicopter concept early in the Vietnam conflict and, in essence, set the stage for all helicopter gunships and units that followed.

I would like to contact any former members of the UTT, or others having information about its operations, who would be willing to share their memories, experiences and observations with me.

James D. Sprinkle
920 Timber View Dr.
Bedford, TX 76021

Editor:

I'm trying to get some people together for a reunion! The commanding officer of our battalion told me to drop you a line.

My company is the 281st Assault Helicopter Company, Nha Trang, Vietnam.

Anyone interested in getting a reunion going, contact: Duane A. Brudvig, 8208 Sumter Avenue, N., Brooklyn Park, MN 55445. Thank you very much!

Duane A. Brudvig
Brooklyn Park, MN 55445

Editor:

Currently I am attending the Brazilian Command and Staff College. Previously, I had the good experience of being assigned to the 101st ABN Div (AASLT) for 4 years. Although I am not an aviator I quickly developed a keen interest in Army Aviation. I have carried my interest to Brazil and have had the opportunity to discuss a number of issues with my fellow officers here. They have read [some of] CPT Ron Klein's articles in the *Digest*, and asked if I could get them a complete set.

CPT(P) Samuel K. Stouffer
FAO Brazil

Editor's note: Captain Klein's series of tactics articles are:

- **"Aviation Employment in the Special Purpose Operations," September 1984 issue, page 3.**
- **"Aviation Employment in the Offensive Operations," October 1984 issue, page 22.**
- **"Aviation Employment in the Defensive Operations," November 1984 issue, page 8.**

Articles from the Aviation Digest requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, U.S. Army Aviation Digest, P.O. Box 699, Ft. Rucker, AL 36362-5000.

Correction

The September ATC Action Line "Parachute Jumping" was printed with some lines missing. The two subheadings affected are given here correctly, in their entirety.

Over An Airport Without A Functioning U.S. Operated Control Tower Or Onto Any Airport:

- Requires authorization from the airport management.
- Request for approval must be submitted before jump to airport management.

In Or Into A Control Zone With A Functioning U.S. Operated Control Tower:

- Requires authorization from the control tower.
- Request for authorization must be submitted before the jump to the control tower having jurisdiction over the control zone.
- Controllers may either authorize or withhold authorization for jump.

PRECISION VS. *NONPRECISION* APPROACH

CW3 Robert M. Baucom
Directorate of Evaluation and Standardization
U.S. Army Aviation Center
Fort Rucker, AL

PUBLICATION OF Change 4 to AR 95-1 has narrowed the distinction between precision and *nonprecision* instrument approach procedures to the extent that a review of one of the significant remaining differences is appropriate.

Note the wording of paragraph 4-5d, "An aircraft will not be flown below the published MDA [minimum descent altitude] or an approach continued below the DH [decision height] unless the following exist...." Thus, the MDA of a *nonprecision* approach is an inviolable altitude throughout the entire final approach segment, until landing criteria can be met.

By contrast, the safety provisions designed into a precision approach anticipate that an aircraft on course and on glidepath will actually descend below DH by a few feet, the amount depending on aircraft category factors, rate of descent, etc. For example, assuming that the "go-around" decision is made *at decision height*, and power is then adjusted as appropriate to discontinue the final approach and to initiate the missed approach procedure; and 8,000-pound aircraft in a 480-foot-per-minute descent to maintain a 3-degree glidepath at 90 knots groundspeed can be expected to continue its descent about 50 feet below DH. Newton's laws of inertia and acceleration still apply! This explanation must not be interpreted as a license to delay the pilot's missed-approach decision, or actions, beyond decision height.

Course and glidepath information become increasingly more precise as the aircraft approaches the missed approach point, or decision height. Therefore, any premature power adjustment in anticipation of decision height could force an early abandonment of the approach at its most critical stage. A clear understanding of instrument approach procedures may make the difference between a successful landing or a low-level, white-knuckle episode, or worse!

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362-5000; or call us at AUTOVON 558-3504, FTS 533-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or 205-255-6487 and leave a message.

U.S. Army Class A Aviation Flight Mishaps

	Number	Flying Hours (estimated)	Rate	Fatalities	Total Cost (in millions)
FY 85 (to 30 November)	7	257,982	2.71	3	$6.6
FY 86 (to 30 November)	8	255,161	3.14	1	$6.1

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Occupational Safety

Unapproved Earplugs in Navy Supply System—The Navy Environmental Health Center obtained samples of a new foam earplug called "SQUEEZE-ME" manufactured by Plasmed, Inc. that were received by a naval activity under national stock number (NSN) 6515-00-137-6345 (plug, ear, hearing protection, universal size, 400s). The plugs resemble the foam earplugs normally supplied under this NSN by Cabot Corporation called E-A-R Plugs or "DECIDAMP." However, the Plasmed, Inc. product is not acceptable for Navy use because: The physical size deviates from the purchase description and varies widely from plug to plug; the foam material is softer than the approved earplug material and expands too quickly after the "roll down" preparation for insertion; the color is a light beige or bone rather than yellow or white as required; the noise reduction rating (NRR) value is suspiciously high. The NRR of 32 is listed on the box; *the product has not been tested by any naval laboratory and has not been approved for use in the Navy Hearing Conservation Program.*

Inspect your stock of NSN 6515-00-137-6345 and suspend, locally, any earplugs called "SQUEEZE-ME" manufactured by Plasmed, Inc., until further notice. To procure suitable replacement material, order under NSN cited and specify document identifier code A05 or A0E for overseas and continental United States activities in card columns 1-3 of MILSTRIP requisition. Specify FSCM U3216 and reference number E-A-R in exception data to receive E-A-R plugs from Cabot Corporation. Note: The source for the above information is published in a Navy Medical and Dental Materiel Bulletin. *It is possible the U.S. Army may be using this item; therefore, be alerted to the need to inspect your earplugs to see if you may be using them. Follow the instructions listed above.* PEARL, and the U.S. Army Aviation Safety Center, Ft. Rucker, AL, point of contact is Mr. Sand, AUTOVON 558-2947.

Aircraft First Aid Kits

A first aid kit that is being serviced or has been "moonlighted" is treated the same way. The aircraft is placed on a *circled red X* and if the aircraft is authorized only one first aid kit the status is *red X*. If no first aid kits are onboard the aircraft, the aircraft is *GROUNDED*. You would then make an entry on the DA Form 2408-13 showing that the kits were removed. When there is at least one first aid kit but not the total number required, you would have a *circled red X* condition. Compliments of PEARL's.

Mary Makowski photo by CPT Karl Graef

Thoughts And Scenarios—Survival of Aircrew Personnel

He felt the chute open and reached for the lifevest toggles. Just as his hands touched the toggles he hit the water which knocked his hands off the toggles. He was sinking and swam to the surface through shroud lines. He was unable to breathe through the oxygen mask. He surfaced,

rolled on his back and released one side of his mask. He found that the lines were all over him! He inflated his lifevest but the flotation collar did not fully inflate. He released the Koch fittings separating the parachute risers. The waves kept breaking over his head causing aspiration of water. He felt that the helmet and oxygen mask hampered his effort to keep his head above water. He felt that the rigid survival kit was adding to his problem, so he released the kit but felt it hang in the lines as it sank. This caused an even greater difficulty in keeping his head above water. He kicked and felt the lines tightening around him as the kit fell free. The parachute started sinking, pulling him under. He felt the lines start to tighten more. He gave up! He knew he was going to drown.

This successful ejection scenario but subsequent descent into the *hostile water environment* is not a dramatization. It is a real survival narrative taken from a debriefing of one who survived such an ordeal. Learn all you can about ejection, ditching and water survival; it may well give you the edge to live. [Army Aviation had three aircraft go into the water last year.]

Hypothermia and Cold Water Immersion

Full credit is given to Charles Dugan, U.S. Coast Guard Aviation Training Center, Mobile, AL. The following information has been shortened in order to acquaint you with the dangers of cold water immersion and its chilling, often times fatal effect on the body.

Introduction: More than 100 million swimmers, 53 million boaters and thousands of aviators, both military and civilian, are often prone to the dangers of cold water immersion. Hopefully the following will prepare you to cope with the problem, if you find yourself in a life or death situation dealing with cold water immersion.

The U.S. Coast Guard, along with other organizations, is indoctrinating the public in the subjects of water safety and the techniques of water survival. As a result of these endeavors, the boating fatality rate has been reduced by 50 percent.

Survivors of aircraft crashes and vessel sinking incidents frequently suffer from a condition known as hypothermia, which is the lowering of the body's core temperature. For years it has been referred to as exposure.

The sinking of the *Titanic* in 1912 provided a dramatic example of the effects of hypothermia and cold water immersion. Partially due to a lack of preparedness with protective clothing, adequate flotation equipment and a knowledge of survival procedures, not one of the 1,489 persons immersed in the 32 degree Fahrenheit water was alive when the rescue vessel arrived 1 hour and 50 minutes later. Interestingly, nearly all of the people in the lifeboats were alive. An individual's will to live plays an important part in his survivability.

How long can you survive in cold water? What is considered cold? The U.S. Coast Guard defines cold as less than 70 degrees Fahrenheit. Our survival in cold water depends upon many factors: The temperature of the water is only one. Other factors include your body size and activity while in the water. Large people cool slower than small people. If you swim or thrash around, you will increase your cooling rate by about 35 percent.

The method called "drown-proofing" that some of you are familiar with requires you to submerge your head in water; this will increase your cooling rate in the vicinity of 82 percent. The body's high heat loss areas are the head-neck, underarm or sides, and the groin. A person in light clothing with a flotation device may survive 2½ to 3 hours, if he or she remains still. *OK—so what do I do if I should end up in cold water?* Should I try to swim to shore assuming it is within sight? Remember that distances on the water are deceiving. Personally, I would not recommend it unless you are a good swimmer and if you have no chance of being seen and/or being rescued. Some strong swimmers have been able to swim nearly a mile in 50 degree Fahrenheit water before being overcome by hypothermia. Others have swum less than 100 yards. I would advise you to stay with the boat or raft—on the boat/raft and out of the water.

Two positions you can assume while in the water will increase your survival time; HELP—which is a Heat Escape Lessening Position; the other is called HUDDLE—if you are in the water with other persons, join arms, huddle together side by side to conserve body heat.

Heat Stress

After working or playing outside on a hot day, have you ever felt dizzy or had muscle cramps? If you have, then you probably had a reaction to heat stress. Heat stress is a combination of environmental heat and physical activity that produces body heat. You have to have both to create heat stress. The body reacts according to the degree of heat stress, and sometimes a heat related illness occurs. Heat cramps, heat exhaustion and heat stroke are three related illnesses. Better to be aware than to be the subject. **Courtesy of *TAC ATTACK*, Langley AFB, VA.**

If you have a question about personal equipment or rescue/survival gear, write PEARL, AMC Project Officer, ATTN: AMCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63210-1798 or call AUTOVON 693-3818 or Commercial 314-263-3818.

Cockpit Management —The Safety Window

By Douglas Schwartz
Flight Safety International

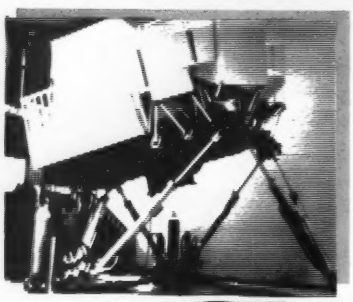
TECHNOLOGY creates change. As pilots we see that change manifested in the aircraft we fly and the system within which we fly these aircraft. The pilot's role is also changing from one of control manipulator to that of information processor. We look to the training process to keep skills honed as new technologies blend with and take the place of old ones. We accommodate change through training.

A major benefit of these changes has been a steady reduction in the accident toll. Accidents do still occur, however. By examining these accidents we may be able to prevent future ones.

In this article we will look at two ways to view accident statistics. We will examine a concept called "The Safety Window," and another called "Situational Awareness." We will also look at some cockpit management skills that affect situational awareness and safety.

A Look at Statistics

A conventional view of accident statistics distinguishes occurrences by phase of flight from takeoff through landing. For example, "A" percent of the accidents occur in the takeoff phase, "B" percent of the accidents in the climb phase and so on as shown in figure 1.



U.S. ARMY SAFETY CENTER

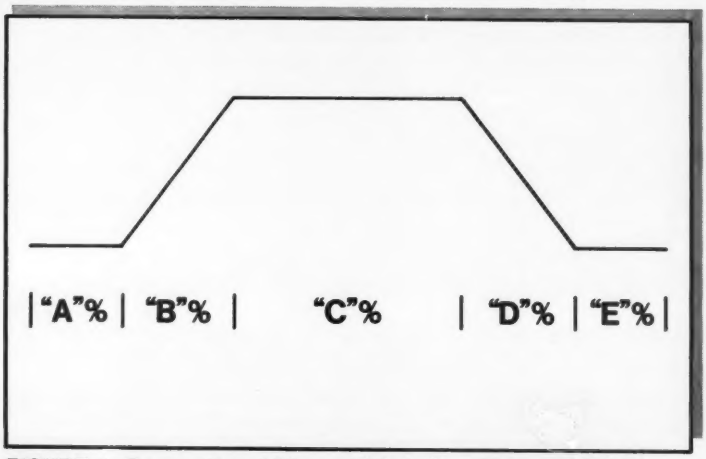


FIGURE 1. Conventional View of Statistics: Phase of Flight

The alternate view of statistics shown in figure 2 looks only at those phases of flight in which the majority of accidents occur. This view displays a profile that includes the approach, landing, takeoff and takeoff climb phases of flight. This profile covers a very short period of time, generally about 6 minutes, but this is the period when most of the accidents happen.

The Safety Window

As illustrated in figure 3, the safety window is a block of airspace extending from the ground to 2,000 feet above ground level. Centered around a runway, the window begins at or near a final approach fix and extends through the end of the final segment of takeoff climb.

Consider these significant observations about the safety window:

- The window is 4 to 6 minutes long when flown in a conventional turboprop or turbojet aircraft.
- Eighty-three percent of the accidents involving professional pilots occur within this window.
- Ninety percent of those accidents are generic; that is, their cause is not peculiar to a particular type of aircraft. For example, failure to extend the landing gear will result in a gear-up landing regardless of aircraft type. Generic accidents and incidents tend to be pilot-caused rather than aircraft-caused.

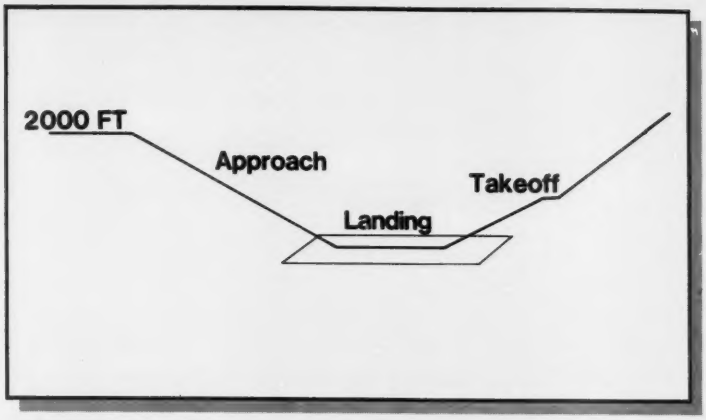


FIGURE 2. Alternate View of Statistics: Phase of Flight

The short period of time spent in the safety window is generally also the most critical portion of flight in terms of pilot workload. A pilot's information-processing skills are more highly taxed while in the safety window than during any other phase of flight. Checklists, instruments, air traffic control communications, crew communications, aircraft configuration and speed changes, weather conditions, traffic, control manipulation and approach monitoring all come together at once within the safety window. Therefore, the safety window includes not only those phases of flight in which the majority of accidents occur, but also those with the highest pilot workload.

This article focuses on the safety window. However, windows can exist at any time in flight, and they can be defined in many ways. But generally, "window" can be used to define any critical period of flight time.

What can be learned from the safety window? Should a pilot leave it if something goes wrong, or should he stay there and land as soon as possible? What criteria can he use to make that decision?

There is evidence to support both options. In a study of flight crews using a Bell 222 visual/motion simulator, pilots were given a catastrophic tail rotor failure shortly after liftoff. Those instructed to land immediately upon encountering the failure crashed in more than 80 percent of the cases. However, pilots instructed to climb to a safe altitude and stabilize there until they felt prepared to land crashed less than 20 percent of the time. In this case it is clear that leaving the window is the best choice.

Now consider another case. A twin-engine jet aircraft on half-mile

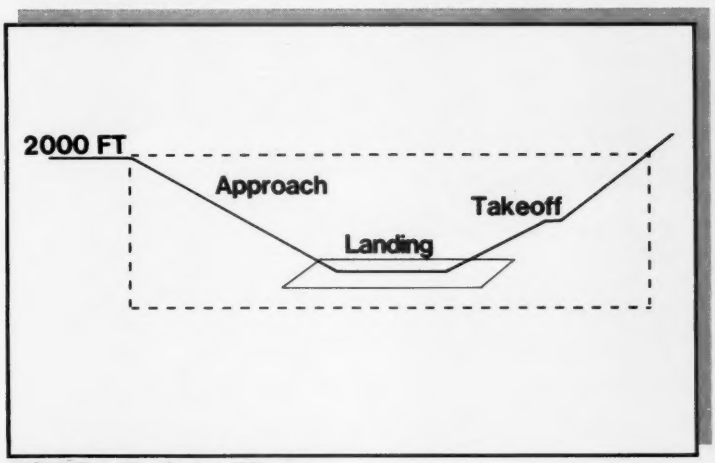


FIGURE 3. The Safety Window

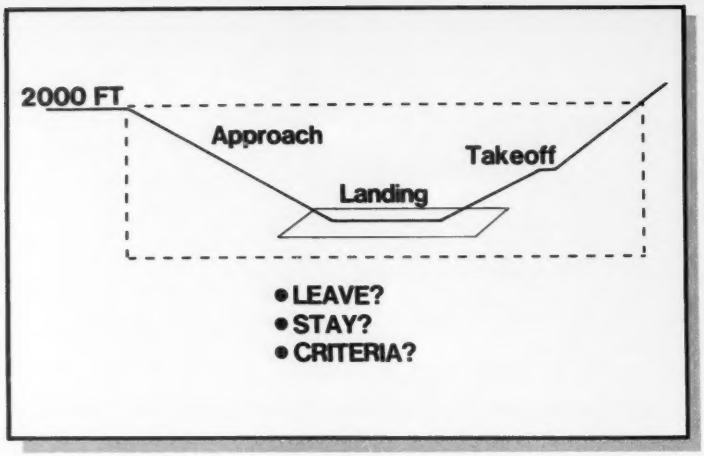


FIGURE 4. Pilot Decision on the Safety Window

final with clearance to land suddenly has an engine fire warning. The aircraft is configured to land, is stable, and both engines appear to be operating normally. The crew elects to complete the landing and wait until the aircraft is on the ground to attend to the fire warning. Most pilots would agree that landing rather than going around is the best option. In this instance, it is best to remain in the safety window.

The facts show that there are conditions under which one should leave the safety window, *and* there are conditions under which one should stay in the safety window.

Situational Awareness

The criteria for determining appropriate actions is called "situational awareness." Situational awareness is the key to managing risk factors in the safety window. Situational awareness can be defined as an accurate perception of the factors and conditions that affect the aircraft and the flight crew during a specific period of time. Put more simply, situational awareness is knowing what is going on around you or thinking ahead of the aircraft. This is a concept taught to student pilots from the beginning of flight training.

An excellent illustration of situational awareness is the drunk driver. Drunk drivers have dulled senses, an unfounded sense of well-being, impaired hand-eye coordination and slowed reactions. They really *don't* know what's going on around them. They have low situational awareness and are likely to have an accident.

Situational Awareness and Safety

A distinct relationship exists between situational awareness and accidents. High situational awareness yields lower mishap potential. Low situational awareness yields higher mishap potential. The more pilots know about what is going on around them, the safer they will be.

In the case of the Bell 222, the tail rotor failure interfered with situational awareness. Leaving the safety window was the best choice because it gave the pilots a chance to regain situational awareness following the malfunction. Those who stayed in the window were clearly at a disadvantage. The crew with the engine fire warning maintained their situational awareness throughout the failure. Landing was the appropriate choice.

Consider these guidelines for flight in the safety window.

- Maximize situational awareness before entering the window: be prepared.
- Avoid entering the window until situational awareness is achieved: don't ask for trouble.
- Consider leaving the window when situational awareness is lost.

Reenter the window only when situational awareness is regained.

Elements of Situational Awareness

The following elements contribute to situational awareness.

- **Experience.** Experience creates a mental file pilots draw upon every time they fly. They use this file to assess conditions and make decisions. Under pressure, people tend to revert to previous patterns of behavior. An individual's experience file helps establish how he will interpret and respond to a given set of conditions.
- **Training.** Training does far more than perfect skills. Training adds to a pilot's experience file by creating events that rarely happen in real life. For example, a flight simulator can compress a lifetime of experience into a very short period of time. Few pilots will ever actually have engine failure at V_1. Yet, through training, it can become part of their experience so that, if and when it does occur, there will be something to draw upon.
- **Spatial orientation.** Spatial orientation is position awareness: knowing where the aircraft is in relation to VORs, airports, runways, terrain, altitude, attitude, and other aircraft. It is where you are and where you are going.
- **Physical flying skills.** As the pilot's role becomes one of a cockpit manager, it must be remembered that pilots still have to be able to fly the aircraft proficiently. Control manipulation continues to be an important part of a pilot's job.
- **Ability to process information.** This is the ability to use information from sense inputs, instruments and other sources to form an accurate picture of what is happening. It can be said that this is the ability to integrate all the elements that contribute to

situational awareness.

• **Cockpit management skills.** These contribute to a pilot's ability to manage the total flight environment. We will examine this area in more detail later in this article.

• **Personal attitude.** Professionalism is a matter of attitude. Safety does not just happen: you make it happen. To be safe, one must think safe.

• **Emotional and physical condition.** An individual's emotional and physical condition affects his perception of the environment. Emotional problems, mental illness, impaired physical condition and negative frame of mind can cloud or distort an accurate perception of events or conditions.

These eight elements contribute to situational awareness. Who controls these elements? The pilot does. Each element plays a role in a pilot's ability to fly safely. Anything done to enhance any of these elements will improve the pilot's situational awareness.

Cockpit Management

A closer look at cockpit management skills is particularly fitting in view of the continuing role change of the pilot to that of an information processor or manager.

Cockpit management can be defined as the use and coordination of *all* resources available to the crew to achieve the goal of safety, efficiency and comfort of flight. Note that this definition does not exclude resources outside the cockpit. Instead, it stresses the use of *all* resources, inside or outside the cockpit.

The skills that contribute to cockpit management can be taught and should be practiced. They are practical skills that are used every day. The following skills contribute to good cockpit management.

1. **Checklist use and function.** This includes understanding flow patterns and philosophies behind normal, abnormal and emergency checklists, how and when to use them, and an appreciation for what they do and do not do for the pilot.

2. **Cockpit management resources.** To use a resource, a pilot must know it exists and what it can do. Being able to identify and use all the resources available is critical to safety of flight.

3. **Communicating skills.** Effective communication is critical to pilots. Learning to listen effectively is just as important as making sure a point is made.

4. **Managing distraction.** It is essential to recognize the sources of distractions in the cockpit and manage them so they will not interfere with job performance. The consequences of mismanaged distractions can be severe.

5. **Flight planning and progress monitoring.** This involves establishing the parameters and limitations of a flight, making progressive decisions and taking appropriate actions to remain within those parameters. It also includes monitoring changing conditions that may affect the parameters established during a flight and establishing new limitations as required.

6. **Judgment and decision-making.** This involves learning the elements of making good decisions and putting them to use. Making a decision should follow a logical sequence in order to collect adequate facts, assess alternatives and implement in a timely manner.

7. **Managing people.** Good management includes dealing with people to get maximum performance from them. An understanding of the concepts of command and leadership is vital. This requires consideration of personality and understanding what makes people tick and how to motivate them.

8. **Pattern recognition.** Pilots must learn to recognize event chains that may lead to errors or undesirable conditions. This is a particularly interesting area which is receiving growing attention from the academic community. There is evidence that people can be taught to recognize erroneous behavior in themselves, enabling them to interrupt error chains that might otherwise lead to accidents.

9. **Stress.** Recognizing stress, its effects on performance and how it can be managed so that safety of flight is not sacrificed is important. Stress can be physical as well as mental.

10. **Workload assessment and time management.** This examines the need to establish priorities and assign tasks. It does no good to put out a fire if no one is controlling the airplane.

In conclusion, accidents don't happen by accident. Accidents result from a chain of events. A human being participates in almost every event which forms a link in this chain. The type of aircraft being flown has little to do with whether an accident does or does not happen. This is particularly true in the safety window: approach, landing, takeoff and takeoff climb. The potential for mishaps in the safety window (or anywhere else, for that matter) decreases as the crew's situational awareness increases. Crewmembers' accurate perception of the factors and conditions that affect the aircraft and themselves during a specific period produces situational awareness. Among the elements contributing to situational awareness is the application of good cockpit management skills. These skills have been identified. They should be learned and practiced.

We *can* train to be safe. After all, the best safety device in any aircraft is a well-trained crew.

This article was adapted from a paper Douglas Schwartz of Flight-Safety International presented to the Flight Safety Foundation, Inc., at the 30th Corporate Aviation Safety Seminar in Dallas, TX, April 14-16, 1985.

AVIATION PERSONNEL NOTES

Warrant Officer Division (CW4 John R. Dougherty)

The Warrant Officer Division, Officer Personnel Management Directorate, U. S. Army Military Personnel Center (MILPERCEN), is responsible for the personnel management of Active Duty warrant officers (see "TWOS' Impact on the AWO Corps," page 1). Currently, that equates to 14,848 warrant officers of whom 6,975 are Aviation and 7,873 are technical service warrant officers. To accomplish its mission the Warrant Officer Division has assigned to it 3 commissioned and 19 warrant officers who are supported by a staff of 19 Department of the Army civilian employees. A roster listing key personnel and their area(s) of responsibility, office symbols and telephone numbers is provided below for reference.

The division is organized with a division chief, Professional Development Branch, Personnel Actions Branch, Aviation Assignment Branch, Technical Services Assignment Branch and Personnel Support Branch. Specific responsibilities of each branch are:

Professional Development Branch. The Professional Development (PD) Branch essentially serves as the division operations center. It is the point of contact on all matters pertaining to the warrant officer career program. PD develops, plans, monitors programs and reviews procedures on matters pertaining to warrant officer classification, accessions, use, promotion, retention, training and separation. The branch publishes Department of the Army (DA) Pamphlet 600-11, "Warrant Officer Professional Development," the warrant officer procurement program circular and the warrant officer fixed wing aviator selection circular. It is also the point of contact for all selection boards, which includes coordination of promotion board membership requirements and briefing board members to acquaint them with the warrant officer program. PD is responsible for the coordination of military training and civil schooling for warrant officers, coordinating closely with the assignment branches. This includes monitoring student officer progress through school completion and follow-on utilization assignments for Warrant Officer Senior Course (WOSC) graduates and graduates of fully funded college degree programs to meet Army Education Review Board requirements.

Personnel Actions Branch. The Personnel Actions (PA) Branch has staff responsibility for automation support of the division and the myriad of personnel actions affecting individual warrant officers. PA maintains data on all losses, provides manpower strength projections based on this data, and develops automatic data processing (ADP) programs for personnel management and future planning of the warrant officer career program.

PA processes numerous types of requests for personnel actions pertaining to Active Duty warrant officers prior to final determination by Headquarters, Department of the Army. These actions include processing applications for retention on Active Duty such as requests for voluntary indefinite status, extensions of service beyond mandatory release dates and short-term extensions of obligated volunteers. Additionally, PA processes requests for compassionate reassignment, hardship discharge, release from Active Duty (REFRAD), unqualified resignation, voluntary retirement, military occupational specialty (MOS) reclassification, elimination and Department of the Army Active Duty Boards (DAADB), and computation of service dates. Other actions include medical retirement, direct commissioning, date of rank determination, aviator waivers, standby promotion boards and officer efficiency report (OER) appeals.

Assignments Branches. The two assignments branches, functionally separated into the categories of Aviation and Technical Services, select and assign officers worldwide by MOS. This requires the assignment of officers from 65 MOSs. Career managers review voluntary overseas service applications, curtailments and extensions of overseas service, and intratheater and intertheater transfers. They maintain rosters of volunteers for foreign service and specialized functional training. They also are responsible for career counseling, informing officers and commanders on assignment matters by telephone, writing and conducting personal interviews, briefings and field trips.

Of major importance to warrant officers worldwide is the responsibility of assignment branches to review career management information files and Officer Record Briefs. This is accomplished as assignment actions occur to determine errors and omissions and to initiate corrective actions. The individual career managers also participate in special studies and task forces related to career and assignment matters.

Personnel Support Branch. The primary responsibility of the Personnel Support Branch is to provide administrative support to the division. These functions include processing requests for orders, inputting to the data base, correcting Officer Record Briefs, maintaining the mili-

Key Personnel Roster	
Division Chief	
221-7831, DAPC-OPW	
COL Joel H. Hinson	
Deputy Division Chief/Chief of Assignments	
221-7832, DAPC-OPW	
LTC George F. Copping	
Professional Development Branch	
221-7843/4, DAPC-OPW-D	
CW4 Dennis M. Jinks	Chief
CW4 John R. Dougherty	Advanced Civil School, Fixed Wing Board, DA Pamphlet 600-11
CW3 George F. Sullivan	Promotion Boards, Regular Army and WOSC Selection
CW2 Ricardo R. Cruz	Warrant Officer Entry Course, Warrant Officer Recruiting
Ms. Brenda J. Norris	Civil and Military Schooling, Constructive Credit, White House Fellows Program
Personnel Actions Branch	
221-7833/4, DAPC-OPW-P	
MAJ William T. Farmer	Chief
CW3 Al De Lucia	Personnel Action Officer
CW2 Ernest Vera	ADP Technician
Ms. Jackie Turner	Voluntary Indefinite, REFRAD, Retirements
Ms. Terrie Jones	Compassionates, DAADB, OER Appeals, Exceptional Family Member Program, Reclassifications, Eliminations
Aviation Assignment Branch	
221-7835/6, DAPC-OPW-AV	
CW4 Grant L. South	Chief
CW4 Euel Henry	100E/K
CW4 Harry P. Arthur	100C/Q/R, 160A
CW4 Alberto Y. Salinas	100A, 100B-OCONUS, 150A
CW4 Joseph A. Hines	100B-CONUS
CW4 Rick Pickard	Ft. Rucker Liaison Officer
Technical Services Assignment Branch	
221-7845, DAPC-OPW	
CW4 Frank Baker	Chief
221-7839/40, DAPC-OPW-WU	
CW3 Charles Osborn	Weapons Maintenance
CW4 Ed Cole	Weapons/Utilities
221-7837/8, DAPC-OPW-GA	
CW4 Mo Broome	Admin/Marine Operations
221-7837/8, DAPC-OPW-CE	
CW4 Ralph Bowden	Communications/Electronics
221-7841/2, DAPC-OPW-II	
CW4 Mike Ebert	Criminal Investigation
CW4 Walt Johnson	Intelligence
221-7840/1, DAPC-OPW-MM	
CW4 Fred Norman	Mechanical Maintenance
221-7839/40, DAPC-OPW-SV	
CW4 Homer Johns	Supply/Services
Personnel Support Branch	
221-7853/4, DAPC-OPW-S	
Mr. Greg Fox	Chief

tary personnel files, division functional files and office distribution systems, and administering civilian personnel management for the division.

Warrant Officer Division has tremendous responsibilities to the Warrant Officer Corps and the Army. We pledge our best effort in fulfilling those responsibilities.

Volunteers Sought For Aeroscout Observer Training

Be an aeroscout observer and have the opportunity to fly. The Enlisted Aviation Branch, MILPERCEN, is soliciting volunteers from MOS 67V (observation/scout helicopter repairer, OH-58) for aerial observer training and assignment to aeroscout observer positions. Soldiers selected will attend the 5-week Aeroscout Observer Course at the Army Aviation Center, Ft. Rucker, AL, and be awarded the additional skill identifier of Z1 upon course completion.

The Enlisted Aerial Observer Course consists of 219 hours of resident instruction. It includes 45 hours of map-reading and nontactical operation, 11 hours of aeroscout techniques and procedures and 150.5 hours of tactical operations. The course also includes 12.5 hours of training conducted during actual flight operations.

To attend the Aerial Observer Course, soldiers must be in pay grade E3 or above, have a GT score of at least 105 and be eligible for a secret clearance. A physical profile of 111111 is required; no waivers are authorized. Volunteers also must meet all physical fitness and weight standards as prescribed in AR 600-9 and AR 350-15. Applicants must successfully complete a Class III flight physical and have 10 months of service remaining upon completion of school. Soldiers with insufficient service time remaining must take action to extend or reenlist prior to attending the course.

Upon successful completion of the Aeroscout Observer Course soldiers are eligible for flight pay in accordance with the Department of Defense Pay Manual and AR 600-106, provided the soldiers occupy an authorized flight position and perform the duties of an aeroscout observer.

Applications should be submitted on DA Form 4187 through the unit commander and MILPO to CDR, MILPERCEN, DAPC-EPT-F, 2461 Eisenhower Avenue, Alexandria, VA 22331-0400. For consideration, each application must include a copy of the approved flight physical, GT score, physical profile and include a statement from the local security office indicating that a preliminary screen of local records indicates that the soldier will qualify for a secret security classification.

For additional information contact the Aviation Enlisted Career Management Branch, AUTOVON 221-8322/-8323.

All services are represented. A U.S. Army UH-60 Black Hawk helicopter is loaded into a USAF C-5A Galaxy for transport. An HAF C-47 "Gooneybird" is taking off in the background. The flight coordination center (at left) is on a mountaintop above the cloud layer.

Voices to the Sky

With limited airspace systems, language barriers and frequency restrictions, air traffic in all Honduras has been relatively uncontrolled. However, with the development of Palmerola Air Base as the hub of aviation operations for the Joint Task Force in Honduras, air traffic control operations have reached new heights.

All photographs by members of the 16th Air Traffic Control Battalion.

Captain Wayne Husemann
Commander, Second Platoon
68th Air Traffic Control
Company (Forward)
Fort Hood, TX

WHILE FLYING through the night air as a passenger in the single engine trainer and enjoying the rock beat of American music, which came from the radio station in the city near the airbase, I became a bit concerned when the Honduran pilot asked me in his heavily accented English, "Do you see any lights down there?"

We suddenly found ourselves in a situation where, at 12,000 feet, we were in instrument meteorological conditions, at night, in extremely mountainous terrain, with only an automatic direction finder (ADF) and a very high frequency (VHF) radio.

The pilot attempted contact with the Spanish speaking tower controllers at Palmerola Air Base without success. Handing me the microphone, he said, "You try." I attempted to contact the English speaking controllers at the tower, on the same frequency, but to no avail. The only other facility available to contact was Palmerola ground controlled approach (GCA), which was operated by Americans on a different VHF frequency. Neither of us was sure of the exact frequency.

We began dialing through the frequencies, checking on each one, when a confident voice announced, "Cessna 142 this is Palmerola GCA." Without a doubt the Palmerola approach which brought us through the clouds was the highlight of my whole day.

Tactical air traffic controllers, from platoons of the 16th and 58th Air Traffic Control (ATC) Battalions, have been providing much needed ATC services in Honduras since 1982. These are the same controllers who provide direct support ATC to all continental United States' divisions and corps. With the development of Palmerola Air Base as the hub of Aviation operations for the joint task force in Honduras, air traffic operations have reached new heights.

The Central American Air Traffic Control System

To be effective, United States military air traffic control systems must be well coordinated with the host nation's system. We must have an understanding of not only how things are done in their country, but also how *similar* things are *done differently*. An example of this is our use of Federal Aviation Administration (FAA) and Department of Defense rules and their use of Honduran military and International Civil Aviation Organization (ICAO) rules.

The airspace system in Honduras is limited when compared with the systems with which most Army aviators fly. The high altitude airspace structure (above flight level (FL) 200) was developed through an alliance of many of the neighboring Central American countries. This civil alliance is called the Corporacion Centroamericana de Servicios de Navegacion Aerea (COCESNA). It provides for all air traffic control services in the region. Its functions could be loosely compared to those of the FAA.

The agency subordinate to COCESNA which provides en route air traffic control is called CENAMER, which operates in Honduras from the capital city of Tegucigalpa. Through the use of radios and flight strips, CENAMER coordinates the movement of aircraft above FL200. A significant difference between the United States and Central America is the lack of air traffic control radar. All en route control uses ICAO nonradar procedures. This presents a problem for many aviators who are not accustomed to flying in a nonradar environment. Any deviation from the colored nondirectional beacon (NDB) based airways, which is common under radar, could mean disaster under this system.

Flight plan coordination is accomplished through the use of high frequency (HF) radios and a teletype system that relays data through a communications center in Kansas to terminals at ATC facilities throughout Central America. Direct telephone communication between facilities is limited. English is the common language for air traffic control at this level.

The Honduran Air Traffic Control System

CENAMER coordinates with the Honduran ATC agency (Tegucigalpa Radio) through the use of a point-to-point telephone. Tegucigalpa Radio is

the ATC facility that provides control for aircraft flying below FL200 in Honduras. Like CENAMER, radar is not used. The communications capabilities of CENAMER, just down the street, are far superior to those of the Honduran facility.

The radios and telephones used by Tegucigalpa Radio would make a Signal Corps officer cringe. A vintage Motorola HF radio is used to coordinate flight plan information with Honduran airfields when the point-to-point telephone system fails. This point-to-point telephone system is provided by the civilian telephone company, HONDUTEL. It provides the means for most telephone communications in Honduras. The VHF radios used for communication with aircraft, although the same vintage as the HF radio, are much more reliable.

Flight plan information passes among five ATC facilities in Honduras. Two airfields are on the north coast, Goloson Tower at La Ceiba and La Mesa Tower at San Pedro Sula. La Mesa is the second busiest of the Honduran civil airfields. It gets flight plan information from COCESNA's teletype system for flights which originate outside of Honduras. Tegucigalpa Radio must also coordinate with the air traffic controllers at Toncontin Tower in the capital city, Tegucigalpa, and Palmerola Air Base. The English speaking capability of the personnel working this system is limited; *most* coordination therefore is conducted in Spanish.

The terrain is extremely mountainous; this causes radio communication to be difficult. The Hondurans have overcome this by developing preferred routes for the aircraft to follow. The routes allow for maximum communications, while maintaining efficient aircraft routing.

Current Development of Aviation In Honduras

From the description of the available ATC facilities, it is easy to see that air traffic in all of Honduras is relatively uncontrolled. Many people have described the situation as somewhat similar to what existed in the United States in the early 1950s; however, the aircraft that are flown are more sophisticated. Among the more advanced aircraft in the military inventory are CASA (C-101) fighters and (A-37) attack airplanes. Civilian airlines, flying Boeing 737s, routinely fly in Honduras. Of course, DC-4s, DC-6s and the diehard C-47 "Gooneybird" are quite common sights at Honduran airfields. In addition, the Air Force also flies a variety of models of the UH-1 helicopter.

Instrument flying to Honduran pilots is different than it is to us in the U.S. Army. Aircraft at the training base at Palmerola are equipped with distance measuring equipment (DME) and an ADF receiver, but no tactical air navigation (TACAN) receiver; therefore, the approach that they fly is known to them as an ADF/DME approach. The ground controlled approach radar, provided by the 16th ATC Battalion of Ft. Hood, TX, to Palmerola Air Base, provides the only opportunity that most Honduran pilots get to fly with ATC radar facilities.

The approaches that Honduran military aviators fly are developed by their military. The standards that they use in developing the approaches are much different than our standards. At civilian airfields, the approaches are developed and flight checked by COCESNA using ICAO standards.

Control zones, or the perceived lack of them, create a major concern for American aviators. A Honduran "control zone" extends in a 5-mile radius around the airfield to 3,000 feet above ground level. Airspace above the control zone is fair game for any type of maneuver. It is not uncommon to see "Tucanos" (T-27s) doing loops and rolls directly over the airfield while other aircraft are landing and taking off. Special VFR clearances are not used; therefore, when the weather becomes marginal, flying becomes even more exciting.

The Building of a Joint Use International Airfield

Palmerola Air Base is the site of the Armed Forces of Honduras Military Academy of Aviation. It has been developed as the major joint use airfield between the Hondurans and the Americans in the region. (See the March 1985 *Aviation Digest* article "Honduran Heights: The Training of a Central American Aviator.") The Honduran and the United States governments constructed an 8,000-foot runway, which is capable of handling heavy aircraft.

By combining available assets from the FAA, the U.S. Air Force, the U.S. Army and the Republic of Honduras Air Force, a variety of navigational aids (NAVAIDs) were procured. NAVAIDs at the airfield include: VHF omnidirectional range/DME, TACAN, NDB and GCA. These NAVAIDs have become invaluable to aviation operations at

ABOVE: Traffic can become heavy at times. A C-5A is landing, while a C-130 is taxiing. Honduran TH-55 helicopters and fixed wing trainers are in the foreground.

RIGHT: Distinguished controllers. SP4 Richard Morrison (left) had the honor of controlling both Air Force Two and Army Two. At right, SP4 Walter Alexis precluded a potential disaster when a dump truck driver, not monitoring the ground control frequency, moved onto the active runway as an aircraft was flaring for touchdown.

Palmerola. The development of approaches for each different NAVAID has been difficult because of the extremely mountainous terrain in proximity to the airfield.

Air traffic control tower operation is also a joint effort. It is generally operated as two towers within one; a Spanish side and an English side, each on separate radio frequencies. Honduran controllers talk with pilots who speak Spanish and U.S. Army controllers with those who speak English. Bilingual Army controllers bridge the communication gap by ensuring that all coordination between English and Spanish speaking controllers is understood correctly. Honduran controllers are the final authority for all controllers' ATC instructions.

Air traffic at the airfield at times is quite busy. One afternoon during the exercises Ahuas Tara III and Universal Trek 85, I was walking down the boardwalk to our operations hooch. I noticed that one of the tower controllers, who had just gotten off shift, had a dazed expression on his face. He justified his expression by explaining, "I have never seen anything like this. I was working three C-130s, a C-141, a C-5A on a TACAN approach, at least three inbound helicopters and

two Honduran student pilots in the pattern, all at the same time."

Student pilots make ATC interesting when mixed with a high volume of air traffic whose crews are generally unfamiliar with Honduran aviation procedures. As anyone who has been a fledgling pilot knows, first time solo students fly an *established* traffic pattern, *deviating for no one*. On many occasions, heavily loaded cargo aircraft and distinguished visitors' aircraft have been asked to hold as a solo student turns downwind in a Cessna trainer.

The arrival of distinguished visitors is common at Palmerola. Task Force or tenant unit commanders have entertained many distinguished visitors ranging from colonels and navy captains to the Vice President of the United States. Preparation for the arrival of each visitor is minimal because such visits occur so frequently.

Until recently, the U.S. Army had the responsibility for base operations at the airfield. This meant that Army flight operations specialists made all the initial coordination with the Honduran civil aviation authorities for the filing and coordination of flight plans. They also were the first to bring information about operational procedures for each of the different flying activities at Palmerola into one central location.

Ground controlled approach radar is operated solely by English speaking U.S. Army air traffic controllers. The radar was installed to provide airport surveillance radar and precision approach radar services. Honduran aviators have become so confident with the radar services that a block of instruction which focuses on the operation and use of the GCA has been incorporated into their flight training program. The controllers are required to pay close attention to their instructions; nearby mountainous terrain leaves little room for error. They

A View From the Tower: Vice President George Bush's airplane, Air Force Two, parked on the ramp.

Vice President George Bush reviewing Honduran troops on the ramp before boarding Army Two (left), the helicopter that transported the Vice President to the Honduran President's house.

are well rewarded for their good efforts. There are few other places in the world where they have the opportunity to control such a variety of aircraft under conditions that are so demanding as are those in Honduras.

Those Special Helicopters

Helicopter operations create many special challenges. Among the largest of these is the problem of flight following. The low altitudes and random routes that helicopters use make the organic ATC system ineffective in meeting the needs of Army helicopters. The flight plans for helicopters are of little concern to the civil air traffic control system.

The Honduran ATC facilities are convenient for communication when the helicopter is doing something that is familiar to that controller; however, this sometimes is not the case. Due to some of the Honduran controllers' limited English speaking ability, such phrases as, "cleared to land," are commonly heard when asking to transition past the airport.

The extremely precipitous terrain makes en route communication for low altitude aircraft difficult at best. The use of a U.S. Army flight coordination center high on a mountaintop was not adequate to meet the flight following needs of helicopter units. The best methods for maintaining radio communications during an entire flight usually include use of a high frequency radio, use of all available ATC facilities and a little patience. The high frequency radio greatly increases the range and effectiveness of radio communications in this type terrain.

The best mountain flying techniques are required of helicopter pilots. Tall mountains and high temperature require pilots to be constantly aware of the helicopter's operating limitations.

The mere presence of helicopters at Palmerola Air Base provides a unique educational opportunity for many military people of the other services, who had never had the opportunity to experience the helicopters' unique operating characteristics. The value of helicopters to our Nation's defense, in a joint service environment, is clearly illustrated in Honduras.

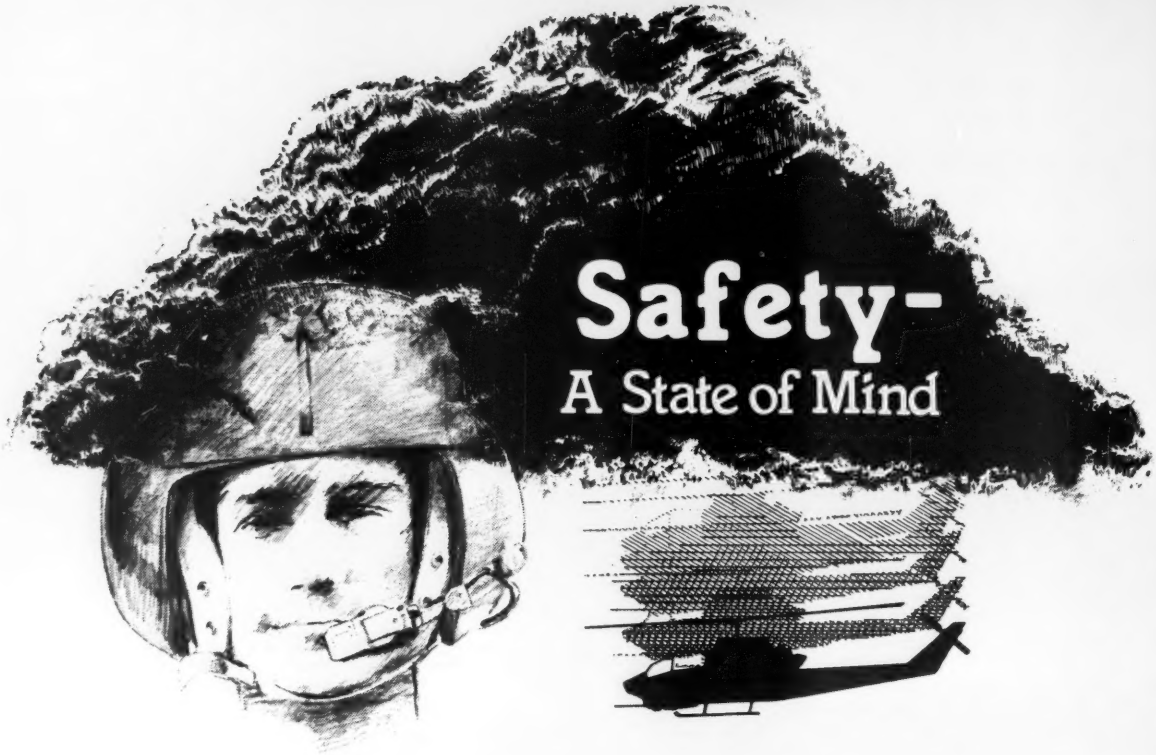
Cold Turkey

Many lessons learned by people who have completed temporary duty in Honduras are lost as they rapidly rotate in and out. The understanding of how a host nation's airspace system works can save many months of development time as United States' forces move into an unfamiliar area of operations. The immediate application of this knowledge is in the development of procedures that are safe and efficient for both civil and military aviation.

Our experience in Honduras has proven that U.S. Army Aviation and U.S. Army air traffic control are ready for whatever challenge may lie ahead.

LEFT: The air traffic control tower was a tactical, mobile tower, which has been remoted to the permanent tower.

BELOW: The L-100 completing a precision approach. The radar antenna, AN/TPN-18A, is in the foreground.



Safety- A State of Mind

CW3 Dennis E. Dura
Army Aviation Support Facility No. 2
Ohio Army National Guard

The only way the Army will ever achieve a zero accident rate in Aviation is to teach safety with as much emphasis as is given to other subjects. This, however, will not be achieved through legislation or intimidation, but rather through instilling safety in the minds of flight students from the very beginning of training.

A FEW YEARS back, I asked a weatherbeaten old aviator, about to retire with umpteen thousand hours of flying time, how he managed never to have had an accident.

The old sage looked at me through his years of experience and said, "I was lucky." He laughed and then added more seriously, "I never went out and purposefully did something dumb."

I am sure that a number of us have asked older and wiser aviators how they managed to fly through the years without anything happening that would have made *Flightfax*. But, I think those two statements made by the "old pro" aviator came the closest to summing up all the various pieces of advice I have read or heard. He was lucky in the sense that nothing ever happened to him that was beyond his control, and he approached flying in an intelligent manner.

There is nothing we can do about "acts of God." If our time is up, at least we have the satisfaction that we've flown the good flight. However, the other side of the coin is our awareness of the intelligent approach to flying. "The devil made me do it," or "it seemed like a good idea at the time," loses the implied humor when an accident occurs that could have

been prevented. The joy of flying fades to a tear when we realize that we have lost so many of our brethren in needless accidents.

All of us collectively project a state of mind that is assimilated within the Aviation community. All the commanders, safety officers, instructor pilots, regulations and procedures couldn't stop us from having an accident if we really worked at it. Notice I wrote "worked at it," not "wanted it." No one wants an accident, but like most accomplishments, it takes a certain amount of dedication to have an accident. This dedication comes from the individual's state of mind toward safety that is prevalent throughout the Aviation community. If we are not collectively strong enough in our safety convictions, some of us will falter, for whatever the reason, and have an accident. However, if all of us have in our "mind's eye" a strong, positive attitude of "Above the Best," then that state of mind will grow into a strong, positive, motivating force counteracting any unsafe tendencies or temptations.

Aviators are trained to instinctively respond to an engine failure in a helicopter by reducing the collective, or in a multiengine airplane by applying power. They also must be trained from the beginning to be safety conscious. By allowing fledgling aviators to develop a safety awareness along with their air sense development, a safety state of mind will be as normal as checking weather prior to flying.

Some commanders think that safety oriented pilots may not accomplish their missions because of self-imposed restrictions. But by definition, safe pilots are those who adhere to current procedures, regulations and the physical limitations of the aircraft. If a mission requires a pilot to exceed a physical limitation of the aircraft, then it will be doomed from the start—an accident will occur. If a mission requires the pilot to violate an established procedure or regulation, then the commander better evaluate the necessity of the mission versus the consequences.

Sometimes we think that a small or isolated negative outlook on safety is negligible in the larger scheme of things. But we tend to ignore what a wise philosopher once said using the example of ripples on the surface of a pond. Each small pebble that strikes the surface of a still pond creates a series of outgoing ripples. When the ripples from two different sources interfere with each other, a disturbance occurs and symmetry is lost. In other words, no one knows in all circumstances the effect he or she may have on another—some time or distance away.

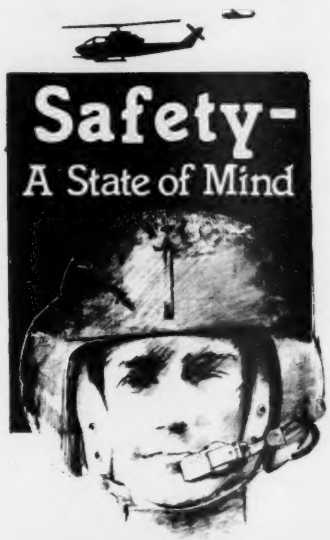
In a military system, intimidation by position can have a positive or negative effect on the safety state of mind. A state of mind against authority can easily be nurtured by overbearing commanders who do not care about exercising leadership principles. But commanders who accomplish missions by being concerned for the welfare of their troops create an esprit de corps that usually strengthens the safety-conscious attitude of the unit.

On a more individual basis, instructor pilots (IPs) who do not perform as true professionals can create in the minds of all the aviators, they come into contact with, a distaste for the very standards that would keep them safe: Whereas, those IPs who strive to "set the example" can strongly influence individual aviators toward safe operation.

The safety state of mind must pervade the whole crew. Each crewmember reinforces the other in their actions during a safe flight. The common denominator in safe flying is the individual crewmember. As crewmembers mature in their chosen professions through dedication, hard work and adherence to the proper procedures and regulations, they make a commitment to the Army to always be ready to accomplish the mission. Their "readiness" can only be sustained through safe operating practices developed and passed on to succeeding crewmembers. In a sense, we are our "brother's keeper." By looking out for each other, we can function as a safe and effective team.

There is some fallacy to the notion that the exercise of common sense will influence an individual to act safely. Common sense is not an altogether innate ability. Experience and an intelligent approach to your actions also develops common sense. That is why a safety awareness must be instilled in the mind from the very beginning of flight training, so that the performance of any flight task under any conditions will be done with what is usually called common sense.

When all is said and done, if we are ever to achieve a *zero* accident rate, everyone throughout Aviation must be made to realize that their individual participation in the program counts. From generals to privates, from standardization instructor pilots to flight students, all must develop an inner safety awareness applicable to their particular jobs. Our state of mind toward safety will, in the final analysis, determine whether we spend our time earth bound, or be where we should be, flying—*Above the Best*!



MONTHLY WRITING AWARD

FIRST CHINOOK AERIAL REFUELING

Major (P) Charles (Chuck) F. Nowlin

ANOTHER ADVANCEMENT for Army Aviation was demonstrated by Boeing Vertol at Wilmington, DE, on 4 August 1985 when the first air-to-air refueling of a CH-47D Chinook helicopter was accomplished with an Air Force Lockheed HC-130P aircraft. I had the opportunity to witness the refueling from the back of the HC-130P and don't mind admitting it was exciting.

It occurred at 0800 hours on a Sunday morning when we launched for the first hookup. I had a seat in the back of the HC-130P, which had been flown to Delaware by the skilled flight crew of Captain Alva Takemoto from the 6594th Test Group of Hickam Field, HI. Through the HC-130's jump door, I had an excellent view of the surrounding sunny Delaware countryside and appreciated the cool morning air whipping through the cabin area.

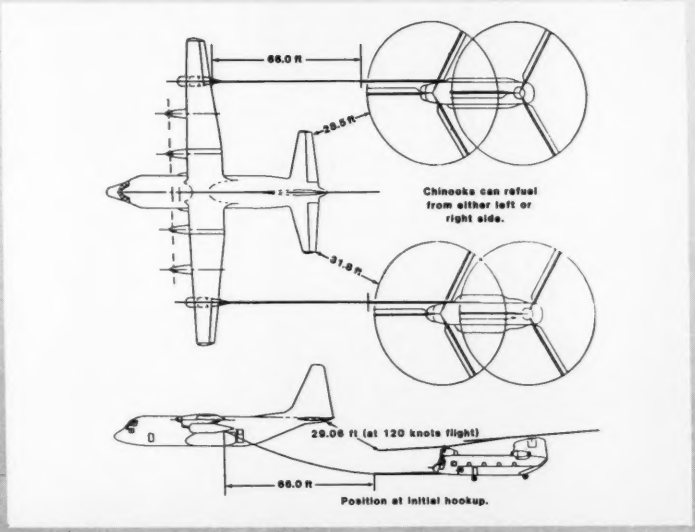
Apprehension built within the cabin as the crew prepared for the first ever

CH-47D refueling demonstration. In their quiet and efficient manner, they readied the ship for the rendezvous. The HC-130P's 1,100 gallon internal fuel tanks were rechecked again as were all connections and final verbal coordinations necessary for the hookup. I had been given a set of headphones on takeoff and the crew had quickly forgotten about my listening-in on their internal conversations.

As the CH-47 was sighted the usual internal flight chatter subsided and the tension began to mount. The aircraft commander initiated the final trim requirements. The CH-47 moved to its prerefueling position, and I thought back to the years of preparation to bring the demonstration to this moment.

Twice before, in the 1960s and 1970s, Boeing had been prepared to demonstrate air-to-air refueling using the CH-47 and a fixed wing, but there was no requirement. Times have changed. In today's world, helicopter air-to-air refueling is essential to the Army's capability to quickly and effectively respond to world threats, before they erupt into major conflicts.

Five aviators, two Boeing test pilots, two Army test pilots from the U.S. Army Engineering Flight Activi-

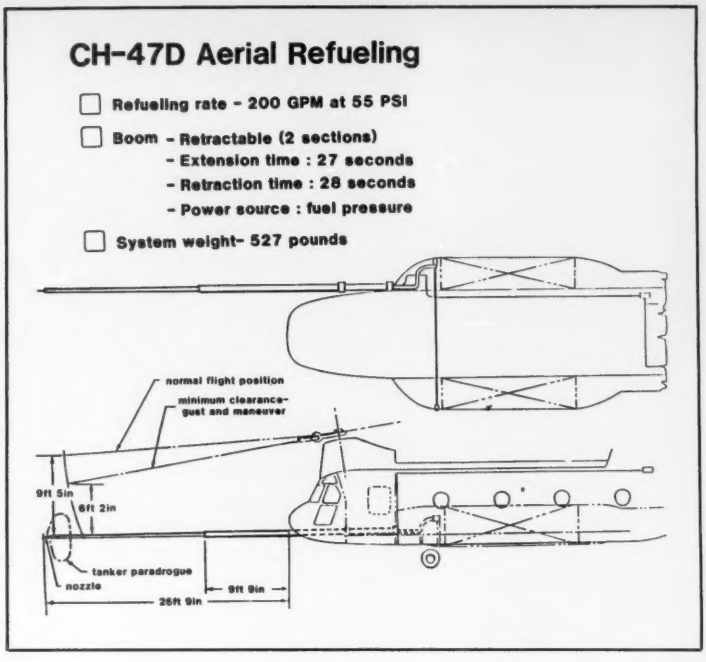


ty, Edwards AFB, CA, and one operational CH-47 aviator had been identified months earlier and sent to Kirtland AFB, NM, to become familiarized with Air Force CH-53 helicopter air-to-air refueling techniques. One of the Boeing test pilots had 12 years of Air Force experience including more than 1,000 hours in CH-53s with air-to-air refueling operations. The remainder of these professional aviators were to learn, as all Aviation pioneers have, by following the book, listening to the engineers, and depending on their own talents and skills. For them, this is what it is all about—ever expanding the aircraft's capability and man's knowledge of flight.

The cameras in the back of the HC-130P, the chase aircraft, and over the shoulder of the CH-47D's test pilot, Mr. Bob Gradle, were all rolling as the other Boeing test pilot, Mr. Lynn Freisner, gave the final go-ahead check in the CH-47D. One of the test pilots had quietly joked the day before that if anything went wrong, at least there would be one hell of a fine coverage for the 6 o'clock news that night.

The 60-foot drogue fuel lines trailing from each of the HC-130P's wing tanks were extended and the CH-47D positioned itself. It moved behind the fixed wing and smoothly held its position as Bob and Lynn made their final preparations for the hookup aligning the helicopter with the 4-foot circular drogue chute on the end of the HC-130's extended fuel lines. On his first attempt, Bob hooked up perfectly. The CH-47D had held its position, then moved up, out of the disturbed air of the fixed wing's airflow.

As the CH-47D held rock steady, I noticed the HC-130P's crewmen begin to look around and glance at each other, as if something strange had just occurred. I realized, no one had said a word, with the exception of a few professional commands between the two aircraft. The CH-47D disconnected, moved out of the refueling position and conducted the second hookup as easily and smoothly as the first. This time I saw two of the Air Force crewmen give a quick hand signal of success to one another.



After the third hookup, still without any chatter on the intercom, I saw several of the crewmen cheering. They were cheering the ease, smoothness and overall steadiness of the CH-47's performance behind the big bird. As the Chinook moved to the right wing to duplicate the same maneuvers three more times, I asked one of the senior noncommissioned officers why all the excitement? After all, wasn't this what they had expected? He said, "Frankly sir, doing this mission is sorta' akin to having a giant lawnmower on your rear, only inches from cutting you out of the air and sending you on your way to the promised land via the JP-4 express." Then I realized the tension and seriousness of the mission these crewmen face daily as they watch large helicopters, only feet from their aircraft, gorging themselves on thousands of pounds of JP-4, and the relief they felt as they watched this tandem giant smoothly slide into place and effortlessly hookup to their refueling drogue.

Bob Gradle made it look like an everyday standard helicopter procedure and not what it really was—a first time! More than 3,575 pounds of JP-4 were transferred during those first seven hookups. Doing some fast math, one can quickly determine a CH-47D, that can accept up to 2,000 pounds of fuel a minute through its 9-inch composite boom, can be air refueled by an HC-130P in a matter of minutes.

The Chinook landed and Mr. Bob Robbins, a Department of the Army civilian test pilot from the Army Engineering Flight Activity, took over flight duties as Bob Gradle moved to the left seat. We continued to hold our flight pattern as the CH-47D returned to have an "Army guy" give it a try. The tension again mounted as the Chinook moved into position. This time the crew was extra concerned. After all,

The "First" Team

Bob Gradle had done this many times before in CH-53s, but this "new guy" was "just a super Chinook" driver and had only done a few familiarization hookups in an Air Force CH-53.

Captain Don Staib, from Kirtland AFB, an Air Force CH-53 instructor pilot riding in the CH-47D's jump seat observing the operation, knew Bob Robbins was darn good, but even so, he retightened his seatbelt and prepared for the rendezvous. With the exception of the drone of its four engines, the silence in the HC-130P was complete as the Chinook moved into the pre-hookup position. Bob Robbins steadily moved the CH-47D into the refueling pre-position, held his position and accelerated to contact with the 4-foot drogue basket, *the first time!* This time I could hear the Air Force crewmen cheering as they watched this professional continue his hookups, twice to each wing. Between these two professional test pilots, 11 "no-miss" hookups occurred on this first day.

The Army's crew (right) were representatives from the U.S. Army Engineering Flight Test Activity at Edwards AFB, CA. They are (from left to right): CW4 Patrick J. Sullivan, Mr. Mike Herbst and Mr. Robert D. Robbins.

The Boeing crew were (from left to right): Mr. Bob Gradle, Mr. Tim Calhoun and Mr. Lynn Freisner.

Personnel who accomplished the flight from San Diego, CA, to Washington, DC, were: SP3 Charles A. Glass and SFC Joseph Lancar (crewchiefs of the Otter); Captains James H. Stebbins and Leonard F. Seitz (Otter pilots); Major General Hamilton H. Howze (Director of Army Aviation who met the flight in Washington); Captain James E. Bowman, Mr. Joseph E. Givens and Major Hugh Gaddis (who flew "Amblin Annie"); PFC Carl D. Harrington and SP2 Robert M. Price ("Amblin Annie's" crewchiefs).

"Amblin Annie"

An Army CH-21 Shawnee, nicknamed "Amblin Annie," was the first helicopter to fly nonstop coast-to-coast. Refueled in flight from a U-1 Otter, the almost 30-hour flight covered close to 3,000 miles. It was flown by Major Hubert D. Gaddis, Captain James Bowman and Mr. Joseph Givens.

As the aircraft landed, the complete team of Boeing, Army and Air Force air and ground crews cheered and posed for pictures. It *was* a "moment." All present, from the men who had loaded the "pig iron" on the CH-47D to the ground instrument monitors, realized they had added a new chapter in Aviation history. The demonstration had gone smoother than anyone had projected. The Boeing Vertol engineers and metal benders had done a superb job of ensuring the composite boom was solid as concrete, and the designers, who had predicted the steady flight characteristics of the Chinook, were surprised at how much safer the system presented itself than *even they* had predicted. The steady characteristic of the tandem rotor and the wide safety clearance, between the rotor tip path plane and the refueling boom, made this system one of the finest that any of the attendees had ever observed.

During the next week, CW4 Pat Sullivan, an Army test pilot from the Army Engineering Flight Activity, entered his name in Aviation history by becoming the first Active Duty Army pilot to refuel a Chinook air-to-air. Thirty-seven times the CH-47D completed the refueling operation and proved, beyond a shadow of a doubt, the CH-47D is an excellent aerial refueling platform, and it has opened all types of new operational aspects for Army Aviation.

On my return to the Pentagon, I shared the first print of a 5-minute video tape of the refueling demonstration with many of the senior Army leaders. It was indeed a grand time for those of us in Army Aviation as I shared this new capability with those charged with today's defense issues; those who have flown in, watched, designed or developed Army Aviation into what it is today through their years of rotary wing dedication and belief in Army heliforce operations. You could see it in their faces as they once again felt the winds of the Army rotary wing fleet and they again skimmed over vast worlds known only to the winged warrior.

Each person shared a common feeling of accomplishment and pride in this new strike innovation, which they had known could be done, and which when combined with our UH-60 aerial refueling capability, will enable the U.S. Army to move anywhere in the world immediately with combat capability, ready for action.

Congratulations to all the men and women of industry, the Air Force and the U.S. Army who brought this long-awaited dream to reality. Now, it is up to the rest of us in Army Aviation to study, build, develop and capitalize on this new dimension and bring it to reality as quickly as possible.

ABOUT THE AUTHOR

MAJ (P) Chuck Nowlin is assigned as the force integration staff officer for medium and heavy lift helicopters in HQDA, Office of the Deputy Chief of Staff for Operations and Plans, Aviation Division, Pentagon, Washington, DC. He received his B.S. from Texas Lutheran College, Seguin, TX, an M.S. from Central Missouri State University, Warrensburg, MO, and is a graduate of USACGSC. He served with B Co, 158th Aviation Battalion; 1st Bde of the 101st Airborne (Air Assault) Division in Vietnam as an operations officer and scout aviator; the 507th Medical Company (Air Ambulance) as an operations officer; the Army Safety Center as an instructor; the 52d Aviation Battalion (Combat), Korea, as an S3; and, the 201st Aviation Company (Assault Helicopter), Korea, as company commander.

U.S. Army Information Systems Command
ATC ACTION LINE

Airfield Crash Grid Map

CRASH GRID MAPS are used to assist both ground and air personnel in locating the site of off-the-airfield aircraft mishaps. The crash grid map should have the recommended 15-nautical mile (NM) radius minimum coverage, a simplified alphanumeric grid and a suitable scale, about 1:100,000 for most locations.

These maps are designed to support the airfield's preaccident plan requirements and are provided to and maintained by each activity listed for the primary and secondary crash alarm circuits in Army Regulation (AR) 385-95. They should be placed in ground and air ambulances and maintained by local medical and Aviation activities. In addition, the crash grid map should be maintained by all other agencies likely to be involved in crash rescue.

AR 420-90, "Fire Protection," paragraph 5-11, a(1) states: "Local crash grid maps will be provided to each flight operation." The responsibility for the "establishment, readiness and accomplishment of the preaccident plan" per AR 385-95 lies with the airfield operations officer, who must ensure that crash grid maps are available.

Your success in producing a crash grid map could be determined by the availability of local area map coverage. You may acquire a commercially produced map, one produced by your installation, or a county or state map, which will assist both ground vehicles and aircraft when training and during actual rescues. These maps may have airfields, hospitals, and fire and police stations already depicted. If so, their use is authorized, but they must be purchased with local funds. Request support from the installation facility engineers in getting an overlay of 5-, 10- and 15-NM concentric circles, an alphanumeric grid and any other information you feel will assist in the rescue process. This is the most expeditious method of producing a crash grid map for your airfield.

If you are unable to produce a crash grid map locally, a special air crash, search and rescue (ACSR) map may be required. In the continental United States, your request should be sent to Director, USAATCA-ASO, ATTN: ASQ-AS-AI, Cameron Station, Alexandria, VA 22304-5050, through command channels. All other airfields should send their requests through command channels to their Mapping, Charting and Geodesy officers at their major Army commands with an information copy to USAATCA-ASO. (NOTE: Previously, a standard ACSR map was produced by the Defense Mapping Agency for selected locations. These maps are no longer available).

Requests for ACSR maps should contain the following:

- Latest copy of the annual military traffic count.
- Civil annual traffic count, if available, when a unit is a tenant at a civil airfield.
- A copy of crash map in use from military or civilian source.
- A list, to include samples, of known local map and photo source material (county, commercial, etc.) at scales from 1:25,000 to no smaller than 1:250,000. They should be as current as possible to reflect latest road construction and other significant manmade details.
- A list of U.S. Army and/or civil facilities capable of accomplishing basic aerial photography to supplement and update above referenced map source material. This will permit the acquisition of information about the latest road network changes, urban development and other selective checkpoints deemed essential to air/ground search and rescue efforts.
- A point of contact at the airfield including the name, rank, organization, address and telephone number of the individual is required.

For further information and assistance, contact Mr. Thomas J. Callahan Jr., AUTOVON 284-7773/7774.

Readers are encouraged to address matters concerning air traffic control to: Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22304-5050.

J-series COMMAND

This article presents first-hand suggestions about successfully commanding a J-Series Headquarters Troop/Company. If properly applied, these same guidelines can be used as a role model for almost any leadership position.

Captain Thomas M. Kolb
Commander, Headquarters, Headquarters Troop
2d Combat Aviation Squadron
2d Armored Cavalry Regiment
APO New York

HAVING RECENTLY completed command of a new J-series table or organization and equipment headquarters troop in a regimental combat Aviation squadron, I was asked to write this article to help future commanders of similar units. You probably already know that force modernization and Army of Excellence initiatives have reorganized battalion/squadron-sized units by consolidating service support into the headquarters companies/troops, thereby breaking from the traditional assignment of support responsibility to the company/troop commander. J-series therefore allows the maneuver companies or troops to be highly mobile and flexible forces, unburdened by otherwise bulky support. As I have now had some time to reflect, several things come to mind which I attribute to the success of command of a headquarters troop (260 soldiers, 100 plus vehicles) in the J-series configuration.

You have the highest concentration of soldiers in the squadron. Therefore, you must establish discipline early. Otherwise, you will spend your command tour sorting blotter reports. Basic standards must be established that cover the appearance of soldiers' equipment, work areas and billets living space. The establishment of these standards may require many additional hours before the desired results are achieved. Identity of the proper standards will require guidance from senior officers, noncommissioned officers (NCOs) and other contemporaries, but must be set high and not allowed to waiver. Once your desired standards are obtained, maintain them. State the standards in standing operating procedures and policy letters and enforce them. Soldiers want to do the right thing. You have to ensure that they know what the right things are.

Inspect your soldiers, their equipment, work and living areas. Scheduled and unscheduled inspections are tools that present a readiness picture to the commander. They project morale and the willingness to perform. Inspect thoroughly. Don't just walk through. Look in the record and logbooks, crawl underneath the vehicle or preflight the aircraft, look in the desk drawers and lockers. Let your soldiers know that you have an indepth interest and are not merely concerned with shallow appearance.

After your inspection, tell your soldiers where they stand and how far they have to go. Reinspect when necessary and don't lower standards just to get the reinspection completed. The goal is to transform established standards into disciplines. Achieving discipline can be done through routines and redundancy. The daily inranks inspection, a walk through the motor park or aircraft parking area while looking for the uninstalled safety pin in the trailer hitch or the aircraft not grounded are methods to check discipline indicators. These items may seem trivial, but they are ***certainly not*** in the face of an accident caused by the loss of a trailer or an electrical fire that causes the loss of equipment or manpower.

Communication is an extremely important aspect in a command of this size. Communication must flow up and down the chain of command. That convoy will never get lined up on time nor will you know that your soldiers have all of their field equipment unless you have a two-way flow of communications. All soldiers need to plan their lives, so let them know what is going to happen, when, how and most important to them, who is involved. Listen to your soldiers' problems. Act on them as rapidly as possible, remembering that if they were your problems you would want them solved "yesterday." Most problems really aren't that difficult. Often, all that is needed is a bit of traffic control in the right system, and the problems will fix themselves. A word from the unit commander whose leadership and knowledge are brought to bear can work miracles.

Training is a word that means a lot but is elusive in its application. Everything we do is training. This article is training for the reader, and me, the writer. Formal training must be recorded; and, in a unit this large with its diversification of ground and Aviation military occupational specialties, a training policy must be established to ensure that skill qualification test (SQT) and Army Training and Evaluation Program (ARTEP) standards are understood and oriented upon in training. SQT windows are printed more than a year in advance and by selection of a "training day" once a week, individual training can be accomplished well in advance of any training schedule and can allow for flexibility during field training exercises (FTXs). If you establish your base training as individual training, the collective training for ARTEPs will take care of itself.

Your soldiers are training as they do their daily jobs. Remember, the headquarters troop has all of the support for the squadron. If C Company has an FTX, headquarters troop does as well. You must capitalize on collective training when the units you support go to the field. The headquarters troop can't go to the field independently without slowing down the squadron. When in the field, set the same standards that you require in garrison. Use the same methods, inspections, enforcement and discipline.

Reward your soldiers for a good performance. Certificates of Achievement and Army Achievement Medals for individual performance are excellent tools to reward soldiers whose sustained superior performance over a period of time so warrants recognition. Use the awards system sparingly, and don't make what should be a normal performance something glorified.

Individual style plays a major role in the management of equipment and personnel. The sheer number of soldiers, pieces of equipment, and the varieties and specialties of each within the one unit serve to spread the unit commander's time thin. Simple planning, thorough inspections and the structuring of available time are necessities. When walking through your unit use the spot-check management techniques when possible. If you identify either a deficiency or an outstanding performance, issue words appropriate to the situation and then follow up at a later date. Make judicious use of your resources. As large a unit as you have, your resources are still scarce, especially in personnel. Treat them all as if they were your last.

Leadership may be the most important aspect upon which you can rely. Instill in your officers and NCOs the view that they are your representatives and must use their personal powers to motivate soldiers as well as their positions and ranks in performing their duties. Tell them that they must exercise their authority and then you, the commander, back them up. Yes, they will make mistakes in judgment, but they also will learn and perform as you develop them. Remind your leaders that you are not training and maintaining for ***IF*** we have a conflict, but for ***WHEN*** we have a conflict. Be an example yourself. Make sure your soldiers observe you. Share their jobs with them as if they were yours—they are. The soldiers will understand your interest and your personal desire for their success.

Don't be reluctant to accept help. My job became easier when the squadron commander gave the S4 the authority to prepare, position and deploy the support platoon. I still had the responsibility for the platoon but now I had a captain assistant. At first I felt my power was being usurped. However, after a couple of months I saw this system giving me that cherished commodity, time. This arrangement gave the soldiers more leadership and the squadron a better support base.

There is no single technique that can be identified as being singularly responsible for the successful command of a J-series headquarters troop/company. Like any other command, it is all-encompassing and requires a lot of time, effort, desire and perseverance. Institutionalize your systems, controls and policies. This will help your senior NCOs and make your job more manageable. Use all of your training, listen to your commanders and rely on your NCOs—your unit will do well.

Mass Casualty "MASH" Exercise

In a 3-day simulated mass casualty "MASH" exercise conducted in the Atlanta area, more than 600 Army Reservists and National Guardsmen received hands-on medical training to enhance real-time disaster readiness.

Master Sergeant Ed Winn
81st U.S. Army Reserve Command
Public Affairs Office
East Point, GA

photo by SP4 Dorothy Young

photo by SP4 Randy Piland

ABOVE: Possibly contaminated by the nuclear research facility explosion, a "victim" gets put on a stretcher for air evacuation.

LEFT: It's important that accident victims be sent to the right place for treatment. These soldiers discuss wounds in the triage section of the MASH hospital.

photo by SP4 Dorothy Young

ABOVE: A "victim" peers out of a MEDEVAC before a helicopter flight to a MASH hospital for treatment of wounds.

ABOVE: Three Hueys are fueled and ready to go to pick up victims at a disaster site to bring them to a MASH unit. The pilots belong to the 145th Medical Detachment (Air Ambulance).

INJURED, AGONIZING bodies were scattered along the ground. Cries for aid were emitting from some 50 disaster victims. The injuries ranged from minor cuts to fatal.

U.S. Army Reserve medical evacuation helicopters were called in to air evacuate the victims to one of two sites, each set up like a Mobile Army Surgical Hospital (popularly called MASH). The scenario was fictitious, the players were Army Reservists and National Guardsmen, but the training was real.

The field training exercise (FTX), conducted during a 3-day period in early October, was the result of a year's planning by members of the Reserve's 3297th U.S. Army Hospital, from Chamblee, GA. It involved more than 600 soldiers from the Army's Reserve Components. All military personnel were performing hands-on medical and related support activities, as if a real disaster had occurred.

First Lieutenant Pembroke Williams, assistant training officer of the 3297th, said the idea for field site medical operations originated when he and several other training officers felt that the unit's personnel, who spent all of their weekend drills working in civilian hospitals, should practice their trades in a field environment.

"Our unit has very little equipment of its own. Almost everything was borrowed from other hospital units. We even had to procure medical utensils. We've been able to X-ray, operate and provide intensive care and dental repair. Generators are providing needed power. The Confederate Signal Corps (a local ham radio club) is providing communications among our three FTX sites," Williams continued.

Cause of the disaster was a simulated explosion at a Government research facility located at Dobbins Air Force Base, northwest of Atlanta. Because of suspected nuclear and/or chemical contamination, nuclear, biological and chemical (NBC) teams were the first to

photo by SP4 Randy Piland

photo by SP4 Randy Piland

ABOVE: Army Reservists rush a victim from a MEDEVAC to a MASH site.

photo by SP4 Randy Piland

ABOVE: MAJ Patrick Griffith (center), an Atlanta neurologist, directs his emergency room personnel. The doctor is a Reservist with the 3297th U.S. Army Hospital headquarters unit.

BELOW: PFC Dale Griffis (left) looks at an X-ray of his head with Army nurse CPT Janet Starr. Both Reservists are assigned to the 3297th U.S. Army Hospital unit.

RIGHT: These Reservists from the 3297th U.S. Army Hospital headquarters unit put up a tent at Peachtree-De Kalb Airport.

SP4 Dorothy Young

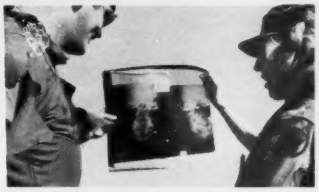


photo by MSG Ed Winn

arrive at the disaster site, sweeping the area to determine if any of the victims were contaminated.

Once the NBC teams separated the contaminated victims from those who were "clean," they called in triage teams from both the 3297th and the 138th Medical Company, a Georgia Army National Guard unit from Atlanta. These teams descended on wounded personnel who were not contaminated, determined the severity and nature of the injuries, provided first aid and tagged the victims for air evacuation.

While the triage teams were busy sorting and treating the injured, the NBC teams were decontaminating those found to have chemical and nuclear wounds. Once these injured were decontaminated, they were released to the triage teams.

Those seriously injured were evacuated to the 3297th's MASH unit located at the Peachtree-DeKalb Airport, in northwest Atlanta. Lesser injured personnel were airlifted to the 138th's MASH site at Lake Allatoona, about a 30-minute helicopter ride north of Dobbins, for treament and release.

The injured were tagged by color, which was based on the degree of urgency for evacuation. Green tags represented minor injuries, where immediate treatment wasn't necessary. Yellow tags indicated more immediate attention was needed, and red tags demanded the highest priority for on-the-spot treatment and evacuation. Personnel with black tags were diagnosed as eventual fatalities, and would be the last to be evacuated, according to Sergeant Richard Lewis.

"We don't want to be cruel, but we have limited space and need to help the ones we can." Lewis, a medic, spoke as he hustled from one victim to another, diagnosing injuries and providing treatment. How did these teams know what kind of injuries the wounded had? Some 50 members of the 3297th were realistically moulaged (wearing injury-simulating makeup) earlier in the day. One evaluator of the exercise commented that acting the part of a victim was a learning experience, since it would help medical personnel make the proper diagnosis in case of real injuries.

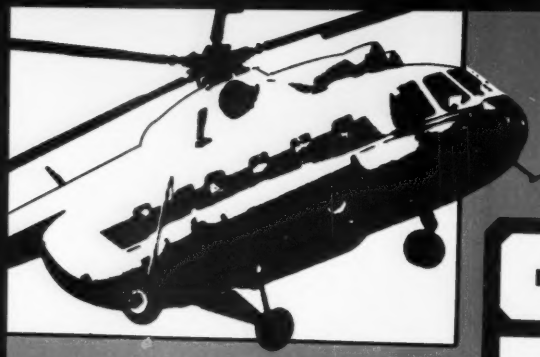
As the injured were flown in by medical helicopters, four-person litter teams ran out to retrieve the victims and take them to the proper tent for treatment. Since the victims were pretagged at the disaster site, this saved considerable time in knowing where to place them.

The mock disaster continued through the windy afternoon into the evening hours, and upon completion was deemed highly successful by evaluators and participants alike.

"Once underway, it was a very meaningful weekend drill. It was so much fun, it didn't seem like work," said LT Williams.

As both the participants and evaluators made clear, the purpose of the exercise was not for speed, but rather for accuracy, and for doing everything safely. The soldiers tried not to make mistakes, but they did learn from the ones they made.

Other Atlanta area participants were the Army Reserve's 145th Medical Detachment (Air Ambulance), the 3299th Dental Services Detachment and the 1014th Supply and Services Company.



SOVIET AIR ASSAULT BRIGADE

PART II: EMPLOYMENT

This month we complete the article "The Soviet Air Assault Brigade" by publishing "Part II: Employment." We thank our guest authors, COL Jack E. Easton and MAJ (P) Charles B. Cook, whose two-part article last month covered "The Origins" and concludes in this month's Threat Section, a feature normally prepared by the Aviation Center's Directorate of Combat Developments. Anyone desiring a copy of Part I can obtain it by writing to Editor, ***Aviation Digest,*** P. O. Box 699, Ft. Rucker, AL 36362-5000; or by calling AUTOVON 558-3178 or FTS 533-3178.

Major Julius Zebenazy
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Colonel Jack E. Easton
Major (P) Charles B. Cook

GENERALLY, military analysts agree that the Soviet armed force's operational concept shift from strategic nuclear rocketry in the 1960s to conventional warfare in the 1970s has had a far-reaching effect on the Soviet military defense organization.

The accepted basis of any future Soviet warfare will be the strategic offensive, directed from a headquarters at the theater level of military operations (TVD). This TVD joint command and control headquarters also has undergone substantial reorganization. Among recent military aviation changes are the decentralization of helicopter assets at the tactical level, the reorganization of airspace management and the re-creation of an "army aviation" entity.[1]

The Soviet image of the future battlefield will no longer resemble a U. S. football game with opposing lines struggling for a breakthrough, but will become more fluid and volatile like a soccer game. One of the more interesting Soviet concepts is the "air-ground assault group" or "Reydoviki" (raid) group as described in the Polish Journal *Zolnierz Wolnosei*, January 1978. Operating under the concept of either tactical or operational control, these Reydoviki units could increase the range of operations in width and depth in a new air-ground dimension, breaking down defenses which have become highly resistant to conventional assault and attacking fighter/ground attack aircraft.[2]

Soviet literature is becoming more open as to established missions which these air assault forces are to perform. The multiplicity of missions in itself suggests the possibility of increasing the number of brigades in existence. Representative of these authors is A. A. Siderenko, who, in his work "The Offensive," mentions the value of teamed helicopters and ground assault units in that "the air landing method does not require special training of personnel, in comparison with the parachute landing method."[3] That a vast new pool of manpower could be available for air delivery was discussed in 1972 by Soviet Army General V. F. Margelov in a book, "Bridgehead From the Clouds." He writes:

> *But perhaps the main distinction of the helicopter landing is that personnel who have been trained for just a few hours can be used. Thus marines, combat engineers, mortarmen and motorized riflemen, that is, representatives of the various arms of troops, can be readily moved to the enemy rear using helicopters and [there] begin active combat operations.*[4]

This early concept thinking, limited to airmobile operations, has now been expanded to include a force structure of elite air assault brigades.

Missions. By 1981, the air-ground assault groups had been accepted and at least one air assault brigade established within each TVD Front.[5] Missions envisioned by leading Soviet air assault advocates are:[6]

- Assisting the forward movement of advancing grouped forces by seizing bridgeheads, crossing sites, road junctions and mountain passes.

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1. U. S. Department of Defense, "Soviet Military Power 1983." Washington, DC: GPO, 1983, page 41.
2. C. N. Donnelly, "The Soviet Helicopter on the Battlefield," *International Defense Review* 17, No. 5, 1984, page 560.
3. A. A. Siderenko, "The Offensive (A Soviet View)." Moscow, 1970, translated by the U. S. Air Force in "Soviet Military Thought," Series No. 1, Washington, DC: GPO, 1974.
4. V. F. Margelov, "Bridgehead From the Clouds." Moscow, 1972, quoted in Graham H. Turbville, "A Soviet View of Heliborne Assault Operations," *Military Review*, October 1975, page 6.
5. U. S. Department of Defense, "Soviet Military Power 1984," page 40.
6. M. Tychkov, "Battalions in a Tactical Air Assault," *Voyennyy Vestnik*, July 1973, page 42; unsigned, "Tactical Air Assaults," *Voyennyy Vestnik*, April 1978, page 35; Yu Chernyshov, "A Tactical Airborne Landing," *Soviet Military Review*, May 1980, page 27; K. Urtaev, "Battalion in an Air Assault," *Voyennyy Vestnik*, March 1971, page 20.

• Seizure of important areas and objectives. This mission primarily involves the seizure of facilities such as airfields which the Soviets intend to use for themselves but they will also deny use by the enemy.

• Disruption of command, control, logistical and other functions in the enemy's rear areas. In general, Reydoviki forces operating in the enemy's rear could delay reinforcements needed for front line combat.

• Preventing the forward movement of enemy reserves. Such a mission would be performed in coordination with an advance by Soviet ground forces.

• Destruction of enemy nuclear weapons. Soviet forces operating in a rear of an enemy have a standing order to take actions against discovered enemy nuclear weapons facilities regardless of other assigned missions.[7]

• Additional special-purpose missions can be visualized including the execution of an amphibious landing, organizing partisan forces in enemy held territory, gathering intelligence, and if necessary, in time of crisis perform the missions of regular infantry.

Soviet Air Assault Brigades can disengage or maneuver within the deep battle with rotary or fixed wing aircraft

Operational Considerations. Air assault operations in a general war scenario can of course vary in scale and tempo, but will follow three types of operations:

- Theater of operation—strategic.
- Operational—fronts and armies.
- Tactical—division and below.

Strategic operations will most likely employ multiple air assault brigades within the theater of operations. Extended objectives could be the seizure of a strategic logistical complex, and even economic or governmental centers. Soviet writers visualize such operations being carried out to a depth of 100 kilometers forward of friendly ground forces and include the heavy use of fixed wing transport aircraft in support of deep thrust operations.[8]

Operational level assault operations probably will be planned by the Front army commander. The depth of the air assault will be keyed to several factors: intermediate objectives en route, the speed of advance of Soviet ground forces and whether or not an immediate linkup is desired or deemed necessary. At this level, the air assault brigade would have the mission of seizing crossing sites or bridgeheads to facilitate the movement of ground forces, capturing airfields for future use, destroying enemy lines of communication or preventing the forward movement of enemy reserves.

Divisional tactical air assault landings will be of battalion size, initiated to accomplish missions similar to those of operational landings, however on a smaller scale and at a depth not to exceed 25 kilometers (within artillery support ranges). Linkup with divisional forces is expected to occur within 6 hours.[9] Small-scale, special-purpose tactical air assault operations also could be conducted for intelligence, sabotage or partisan support.

Tactical Characteristics of the Air Assault

Planning Considerations. Air assault units perform the missions described earlier in Part II. Although the Soviets envision air assault units operating independently behind enemy lines, most operations will be planned for strategic and operational objectives. The Soviets stress that air assault operations must be conducted rapidly and

The heavily armed Mi-8 Hip can provide impressive suppressive fire during the landing phase of the assault.

should be characterized by quick actions, boldness and even risk-taking initiatives on the part of commanders. The planning for such operations is deliberate, thorough and meticulous.[10] The assigned mission determines the size and composition of the force to be employed, and an estimate of the length of time the force can be expected to remain in the enemy's rear area.

Assault units usually are assigned an immediate objective, a substantial task and a primary mission. The immediate objective may or may not be the unit's primary mission. For example, the destruction of a radar site (immediate objective), en route to a bridge crossing site which the attacking force is to seize (substantial task) and hold until the arrival of advancing ground forces (primary mission).[11]

Operational Maneuver Groups can best use the high-tempo, deep striking capabilities of the Soviet air assault brigade

Threat. An estimate and disposition of the enemy force threat and the terrain is the major consideration undertaken during the planning phase. After evaluation of the threat, the Soviets tailor (task organize) for mission accomplishment. For example, when considering the major threat to be air or enemy Army Aviation, the Soviet air assault task force would organize with additional air defense weapons.[12]

Reconnaissance. Reconnaissance planning is both technical and tactical in nature. Tactical reconnaissance provides information concerning the terrain in the area of operations, its relief and the availability of tactical pickup and landing zones. The pickup zone assembly area may be as distant as 60 to 80 kilometers from the front line to enable marshalling and loading unobserved, and to avoid the threat of enemy missile or artillery fires.[13]

If vegetation limits suitable landing zone operations, the air commander gives consideration to special-purpose high explosive bombs that are designed to clear out helicopter landing zones (up to 2½ acres).[14]

Technical reconnaissance provides information about the enemy, his reaction times, countermeasure capabilities, air activity and air defense locations. The Soviet air assault brigade can be expected to use numerous air routes en route to multiple-landing zones (generally one per company team operation) at night and in adverse weather conditions to preclude fixed wing interdiction operations by forces of the North Atlantic Treaty Organization.

Intelligence. Tactical and technical intelligence planning is conducted continuously throughout the planning phase in order to provide the most current information on enemy locations and activities. Of the two, the Soviets believe the technical intelligence effort is by far the more important aspect.

Timing of the Operation. The time selected for the assault can help to reduce operational vulnerability. The Soviets are known to prefer the conduct of assault operations at night, not only because the chances for surprise are enhanced, but also enemy tank, airmobile and fixed wing reaction forces are more restricted during darkness. The Soviets recognize, however, that helicopter operations at night are impeded by problems of orientation and accurate navigation. Depending upon crew training and meteorological conditions, this may be the major limitation to night tactical operations.[15]

Fire Support. In planning, important provisions must be made for fire support. Both air and artillery will be used to suppress air defense along the flight path and to block the approach of enemy air and ground reserves. To accomplish this, routes, schedules and checkpoints are carefully planned in advance.[16]

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7. A. Bykov, "Airborne Battalion in the Advance Detachment," *Voyennyy Vestnik*, September 1978, page 65.
8. M. Belov, "Air Landing Forces," *Soviet Military Review*, January 1979, page 23.
9. Dale D. Best, U. S. Army Training and Doctrine Command, letter dated 12 November 1979, subject: Soviet Motorized Rifle Battalion Heliborne Assault, Ft. Monroe, VA, page 2.
10. Unsigned, "Modern Battle: Questions and Answers," *Soviet Military Review*, No. 1, January 1981, page 31; M. Limantsev, "With Combat Firing," *Voyennyy Vestnik*, No. 12, 1976, page 50.
11. Best, page 1.
12. Turbville, page 7; M. Tychkov, page 43; K. Urtaev, "Battalion in an Air Assault," page 20; V. Zaylsev, "ATGM Battery in a Tactical Air Assault," *Voyennyy Vestnik*, February 1977, pages 76-79
13. M. Belov, page 23.
14. M. Belov, "Helicopters and Land Force Tactics," *Soviet Military Review*, December 1976, page 23. According to Major General Belov, these special purpose bombs can clear a "ground area of nearly a hectre" (about 2½ acres).
15. Donnelly, page 564.

Pickup Zone Operations. Most important, from the point of view of the organization of the ground operation, is the absolutely necessary coordination that takes place between the commander of the ground force and helicopter unit. Together they will arrange for air defense at the pickup zone, the disposition of the helicopters for the loading of equipment, the boarding of personnel and the actual assignment of men and equipment to specific aircraft.[17]

Air Movement. After equipment and personnel are loaded onboard the helicopters, the last soldiers to board before departure are unit leaders and then air defense personnel with handheld SA-14s. The helicopter unit commander determines order of takeoff, air assembly, formation, routes, speed and conditions of flight.

While airborne, the Mi-8 Hip helicopters will be in the lead, followed by Mi-6 Hook heavy transport with heavy equipment and combat vehicles (internal loads). Flying at minimum altitude in multiple flights, transport helicopters are escorted by helicopter gunships. The escorting Mi-24 Hinds precede and operate on either flank of the landing zone.[18]

Air Assault Planning
lengthy operations behind
enemy lines are the exception

Air attack security has a peculiar twist in Soviet tactics. Using individual weapons, troops onboard the transport helicopters provide augmenting sector fires from firing ports as air defense gunners. Flying deceptive "snaking maneuvers" to avoid air attack from the rear, the air commander probably will alter his flight route from the marshalling area to and from the landing zones.[19]

Landing Zones. Multiple landing zones, both the primary and the alternate, are probably chosen jointly by the air and ground commander. Prior to arrival, the landing zone is softened by aerial strikes, and if heavy equipment is not included in the task force, the assault force can either parachute, jump or rappel from the hovering helicopters.[20]

Unloading. The helicopters will be unloaded in reverse order from which they were loaded—air defenders and antitank weapons first, followed by unit commanders, and then troops and equipment in single or multiple landing zones.

Actions which take place following the landing take the form of regular ground offensive maneuvers. Fifteen minutes is considered the maximum time to unload, and, depending upon subsequent lifts, the helicopter may loiter with assault forces at predetermined locations.

Escorting attack helicopters, especially those preceding an air assault operation, can be expected to remain in direct support of landing zone security and initial breakout operations. The Hind *in particular* can help counter either aviation or armor attacks.[21]

Communications. Command and control during Soviet air assault operations are complex and reflect a great dependence on AM (amplitude modulation) and HF (high frequency) radios. The number of radios within units is increasing each year. Pyrotechnics, especially flares, are used for signaling purposes. Wire is rarely used. Except for reports from reconnaissance elements, listening silence is maintained until contact is made with the enemy. When contact is made communications are no longer limited. On lower nets transmissions are often made in the clear. Brevity codes and encrypted messages are used to shorten transmission lengths. Periodic frequency changes are within the concept of Soviet doctrine.[22]

Logistics. Logistics support for air assault units is performed by elements at two separate locations—one in the rear, and the other in the assault area. There is a possibility of en route refueling points being established, provided security is available and whether or not the depth of the operation requires refueling consideration. The size of the logistics contingent that lands in the assault area will depend on the size of the operation and the length of time the unit is expected to operate independently.

Rear services people are trained in the use of captured equipment, weapons, munitions and fuel. Fuel in particular will be in great demand and it requires extensive prior planning. Once on the ground in the operational area, needed logistics will be placed in concealed positions. Usually only sufficient people needed to perform minor repairs and support will actually accompany the assault units. Resupply, if required before linkup, will be by fixed wing transport airplanes at night. Evacuation of casualties will be by helicopter if operations permit.[23]

Emerging Soviet Doctrine. Within the past 20 years,

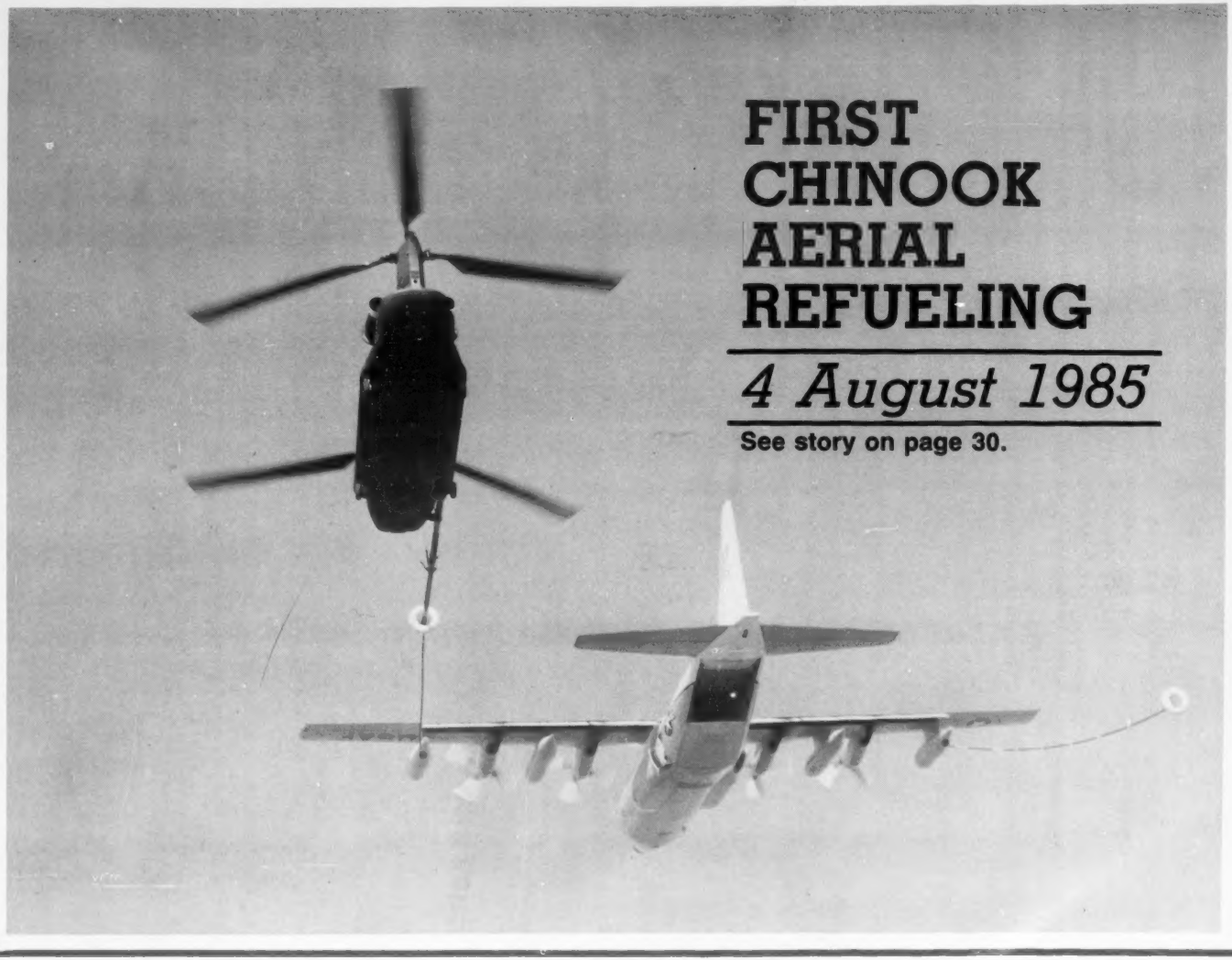
Air assault forces disembark at the landing zone.

the Soviets have revised their traditional view that the helicopter is capable only of marginal gains in combat power. Since 1974, *the Soviets have modernized, restructured and strengthened their entire combat helicopter force* as a component of an already impressive combined arms army.

Changing Soviet doctrine has capitalized on the mobility, firepower and survivability of the helicopter as a functional component of Soviet ground forces operations. *Air assault units have demonstrated the ability to seize critical terrain, destroy high value targets and support high-tempo deep thrust offensive penetrations* during large-scale Soviet field training exercises.

A precise evaluation or the potential effectiveness of Soviet air assault operations would be difficult to evaluate and estimate. Certainly the capability to employ well-equipped forces exists. It is difficult to imagine that the leadership of the Soviet Union would maintain the Reydoviki capability and not plan to extensively use the air assault brigade for decisive, deep striking strategic objectives.

16. The events which make up the air assault are formed from the composite of these articles: M. Belov, "Air Landing Forces," pages 22-23. Yu Chernyshov, "A Tactical Airborne Landing," pages 27-29. M. Tychkov. "Battalions in a Tactical Air Assault," pages 42-46. K. Urtaev, "Battalion in an Air Assault," pages 20-25.
17. Ibid.
18. Ibid.
19. M. Subbotin, "Air Defense of a Tactical Air Landing Force," *Soviet Military Review*, May 1977, page 23.
20. Composite articles, see reference note 16.
21. Ibid.
22. B. Zhukov, "Radio Training Proceeds in the BMD," *Voyennyy Vestnik*, No. 11, 1977, page 78.
23. V. Peplin, "Rear Services of an Airborne Assault: Tasks and Decisions," *Voyennyy Vestnik*, No. 3, 1979, page 65.



FIRST CHINOOK AERIAL REFUELING

4 August 1985

See story on page 30.